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Measuring Interpreting Learners' Cognitive Skills: Scale Validation Using Structural Equation Modeling

Vincent Chieh-Ying Chang

This study focuses on constructing and confirming the reliability of a scale that integrates four key constructs from educational psychology, which are integral to interpreter training. This effort contributes to the niche of "metacognitive interpreter studies" and illustrates the beneficial use of structural equation modeling (SEM) within the realm of Interpreting Studies. A survey served as the primary tool for data collection, with 299 university students, native in Chinese and proficient in English as a second language, from various Chinese-speaking regions, participating voluntarily. The SEM analysis substantiated the scale's validity and reliability. The findings suggest that the scale is a promising tool for assessing how interpreting learners in higher education institutions utilize skills related to the four educational psychology constructs. The research also demonstrates the effective application of SEM in the field of Interpreting Studies.

Keywords: metacognitive interpreter studies, critical thinking, organization skills, metacognitive self-regulation, peer learning

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Vincent Chieh-Ying Chang, Assistant Professor, Department of English, Tamkang University, E-mail: 159738@o365.tku.edu.tw

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衡量口譯培訓生的認知技能：使用結構方程模型進行量表驗證

張介英

本研究旨在建立並驗證一個整合教育心理學中四個關鍵面向的量表，這四大關鍵面向對於口譯員訓練至關重要。此研究對於「後設認知口譯員研究」這一細分領域作出了貢獻，並顯示在口譯研究領域內結構方程模型（SEM）這個分析方式的有效應用。研究採用問卷調查為主要的資料收集工具，共有 299 名以中文為母語、來自不同的華語地區且精通英語作為第二語言的大學生自願參與。SEM 分析證實了該量表的效度和信度。研究結果表明，在口譯訓練評估的層面，該量表具有高度的實用性，可以用以評估高等教育中口譯培訓生如何運用與這四個教育心理學面向息息相關的相關技能。此外，此研究還證明了 SEM 在口譯研究領域的有效應用。

關鍵詞：後設認知口譯員研究、批判性思考、組織技巧、後設認知自我調節、同儕學習

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張介英，淡江大學英文學系助理教授，E-mail: 159738@o365.tku.edu.tw。

Introduction

Drawing on a recent conceptualization of "metacognitive translator studies" or MTS (Pietrzak, 2022) that is translator-centered, the present study attempts to propose a new sub-area of "metacognitive interpreter studies" or MIS that is interpreter-centered as an addition to the "fast-growing and increasingly diverse field of Interpreting Studies" or IS (Pöchhacker, 2015, p. 2).

The article, therefore, falls within the scope of "metacognitive interpreter studies," an emerging sub-area, like "metacognitive translator studies," that has so far received sparse research attention (Pietrzak, 2018, p. 819) and has remained poorly understood. The area of MIS is concurrently considered an extension of "Translator Studies," as proposed by Chesterman (2009, 2021), see also Dam and Zethsen (2009), Munday and Vasserman (2022), focusing on the interpreters themselves instead of the process or the product of interpreting while closely investigating interpreters'/translators' "self-regulatory activity" (Pietrzak, 2018, p. 819) as well as "the nature of self-regulation in translator/interpreter training" (Pietrzak, 2018, p. 819). Drawing on the study by Adnan et al. (2018), the present study attempts to inform MIS anchored within the umbrella field of IS by further exploring potential correlations amongst four educational psychology constructs (Pintrich et al., 1991), i.e., critical thinking, organization, metacognitive self-regulation, and peer learning during tertiary interpreter training in higher education and by developing and validating a scale involving the four constructs.

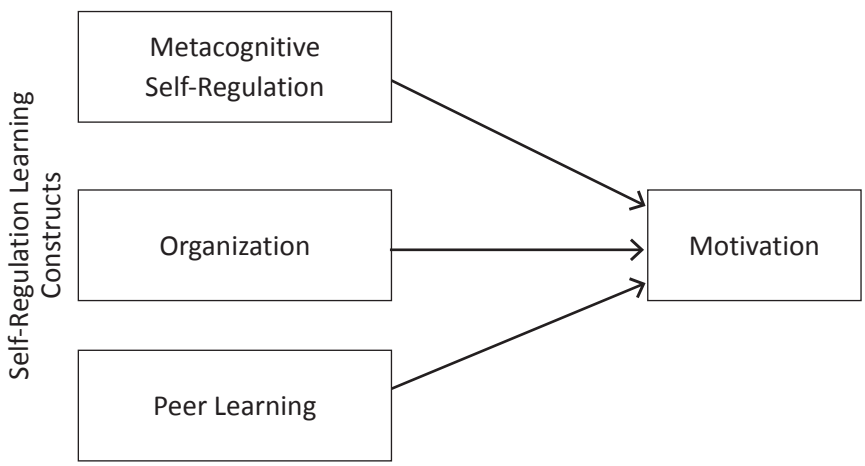
In the study, the term "tertiary interpreting learners" refers to those who undertake interpreter training often provided as an optional module for undergraduate language majors.

To further illustrate, establishing a scale to measure the relation among the three chosen dimensions (organization, metacognitive self-regulation, and peer

learning) against the validity criterion of critical thinking is essential for several compelling reasons rooted in educational theory and empirical research. Adnan et al.'s (2018) work specifically highlighted the intricate interactions between metacognitive self-regulation, organizing skills, and peer learning, as well as their impact on motivation, underscoring the importance of metacognitive strategies which are foundational to critical thinking skills holistically encapsulating the dimension of motivation (Krathwohl, 2002) in higher education (Figure 1).

Figure 1

Conceptual Framework of Self-Regulated Learning Strategies and Motivation



Note. Adapted from Adnan et al. (2018, p. 34)

Additionally, Marschark et al.'s (2005) argument that critical thinking should take precedence over motivation in interpreter and education evaluation aligns with the broader educational shift towards valuing higher order cognitive skills, as highlighted in the context of interpreter education (Marschark et al., 2005). This shift is also reflected in Bloom's taxonomy, where critical thinking skills—such as analysis, evaluation, and synthesis—rank higher than the recall of knowledge, indicating a deeper level of cognitive processing that greatly encompasses and

influences motivational aspects (Krathwohl, 2002).

Critical thinking as a validity criterion offers a more definitive measure of an interpreting learner's ability to not only absorb knowledge but to apply, analyze, synthesize, and evaluate that information in complex and varied contexts (Gile, 2005). By integrating these dimensions into a scale, educators can more accurately assess the efficacy of teaching methods and learning strategies, thereby aligning educational outcomes with the higher-level cognitive skills that are crucial for academic and professional success in a rapidly evolving knowledge economy. This approach ensures that the educational focus shifts from mere motivation to fostering a robust, analytical, and reflective thinking process, ultimately enhancing the learner's ability to navigate and interpret complex information effectively (Pöchhacker, 2016).

Tertiary Interpreting Learners in Higher Education in the Greater Chinese-Speaking Region

As of late, amidst globalization, the higher education landscape worldwide has been increasingly dynamic, with the rise of new higher education providers and the explosive demand for translation and interpreting talents with cross-language and intercultural skills (Biel & Sosoni, 2017, p. 353; Bielsa, 2005, p. 131). In line with this trend, W. Wang et al. (2020, p. 1) have revealed that over 200 formal four-year undergraduate translation and interpreting degree programs in the greater Chinese-speaking region has been launched in the past decade. However, while there is a relative wealth of research available on four-year degree program graduates (Kelly & Martin, 2019; Yan et al., 2017), little research effort has been made to investigate the population of tertiary interpreting learners who take optional interpreting module(s) for a mere semester or two in their college years primarily to improve

their foreign language proficiency (Pym & Ayvazyan, 2017, pp. 393-394; Pym et al., 2013) and to acquire useful interpreting skills to enhance their employability with preliminary interpreting abilities (T. Y. Lee & Liao, 2010, p. 256).

There are several reasons why research on tertiary interpreting learners is lacking. First, many of these students are enrolled in traditional applied linguistics or literature programs, which makes them more difficult to track and study (Xu, 2005, p. 236). Second, they often come from a variety of backgrounds and have different motivations for taking interpreting courses, which makes them harder to categorize and investigate (C. Liu & Yu, 2019, p. 2; Wu, 2016, p. 13). Finally, because they are generally enrolled in optional modules, they are often seen as less committed to becoming interpreters than those who enroll in full-time degree programs (Olvera-Lobo et al., 2005, p. 140).

To summarize, tertiary interpreting learners in higher education represent a unique and under-researched population (Laviosa, 2014; Malmkjær, 2010) that could potentially contribute valuable insights to IS. There is a noticeable research gap concerning tertiary interpreting learners who are perhaps of no interest to interpreting scholars. These settings often present unique challenges and learning dynamics not typically found in more traditional, full-time degree programs. Research in this area can fill a critical gap and contribute to a more comprehensive understanding of interpreter training across different educational contexts. Despite the challenges associated with this population, it is imperative that we study this unique ontology in order to help further inform IS as a whole (J. Liu, 2020, p. 43).

To elaborate, tertiary interpreting learners, as “part-time” participants in higher education interpreter training, offer a distinct perspective on the acquisition and application of interpreting skills under less traditional, more varied educational contexts. Their unique position can contribute to IS in several meaningful ways as follows: First, these learners often balance their studies with other academic or

personal commitments, which may influence their learning strategies and outcomes. Investigating how such diverse contexts affect their skill acquisition can provide insights into flexible, adaptable educational models for interpreter training. Second, insights gained from studying this group can lead to the development of targeted pedagogical strategies that address the specific needs of part-time learners, contributing to more inclusive and effective teaching methodologies. Third, learning from the adaptation and performance of these learners can inform broader educational practices in IS, particularly in enhancing the accessibility and flexibility of training programs to accommodate a wider range of learners.

Positioning Research Perspective

Introduction to Metacognitive Interpreter Studies

This section introduces the new conceptualization of "metacognitive interpreter studies" (MIS), which extends the framework of "metacognitive translator studies" (MTS) as proposed by Pietrzak (2018). By shifting the focus from translation to interpreting, MIS seeks to adapt and apply the holistic and transformative educational principles of MTS to the specific needs and challenges of interpreter training. This reorientation highlights the unique cognitive and metacognitive demands of interpreting and aims to enrich the pedagogical approaches within the field, ensuring that they are more aligned with the dynamic and interactive nature of interpreter education.

The new area of metacognitive translator studies or MTS proposed by Pietrzak (2018, p. 819) is theoretically based on the concept of holistic education and transformative learning (Mezirow, 1981, 1990, 2003; Miller, 2019). This means that the focus is on supporting the learners' overall growth, rather than simply

teaching them, shifting the focus from teaching to learning. In other words, this approach emphasizes supporting the learners' development, rather than simply imparting knowledge. This is in line with the social constructivist approach (Kiraly, 2014), which views learning as an active process where learners construct their own understanding of the world around them, with social constructivism rooted in previous ground-breaking research (Brown et al., 1989; Bruffee, 1999; Dewey, 1986; Rorty, 2009; von Glasersfeld, 1988; Vygotsky, 1994).

The MTS approach to training emphasizes the progress of students' self-awareness and understanding of the cognitive processes involved in translation (Pietrzak, 2022, p. 2). This allows for the activation of personal resources and metacognitive regulation of cognitive processes during training. The practical experience gained from this type of training leads to improved expertise in translation. MTS focus on the skills that translators need to develop in order to be successful, such as self-regulation, self-reflection and self-study (Schaeffer et al., 2020, p. 6).

In addition to such constructs as career choice motivations, self-concept, self-efficacy, metacognitive awareness, job satisfaction, and perceived success covered in the study by Pietrzak (2022, pp. 121-122), the present study seeks to make entry into the sub-area of MIS by attempting to examine the potential interplay(s) amongst critical thinking, organization, metacognitive self-regulation, and peer learning (Pintrich et al., 1991), particularly in the context of tertiary interpreter training as defined by the study. In line with the theoretical conceptualization of MTS, the present study attempts to inform, to a certain extent, the sub-area of MIS within IS to explore interpreter-centered constructs in an educational setting as a way to advance our understanding of the cognitive processes involved in interpreting.

Further, it is worth stressing that Adnan et al. (2018) have specifically demonstrated that organization, metacognitive self-regulation and peer learning had an effect on motivation in higher education; concurrently, studies have indicated

that critical thinking and motivation are closely interconnected both in generic educational settings (Lai, 2011, p. 10) as well as in translation and interpreting classrooms (Jabu et al., 2021, p. 490). Moreover, critical thinking is essential for effective interpreter training, as it allows interpreters to reflect on and evaluate their own performance in order to improve their practice (Junining, 2016, p. 870). This is why the current study has chosen "critical thinking" as the validity criterion (Khine, 2013), against which the validity and reliability of three other educational psychology constructs, namely "organization," "metacognitive self-regulation," and "peer learning" are to be evaluated. Thus, by doing so, the study attempts to develop and validate a scale involving the four constructs that can potentially be used to assess all the four factors on tertiary interpreting learners.

It is particularly worth stressing that, in recent years, IS has seen a resurgence of interest in the role of psychological factors in various interpreting processes. However, much of this research has been limited to "data famine" (Mellinger & Hanson, 2016, p. 10) or small-scale, exploratory studies with little connection to established educational psychology constructs. As a result, there is a lack of understanding of how different educational psychology constructs relate to one another in tertiary interpreter training in higher education, which has motivated the present study to fill the gap.

Further, the term "interpreting learners" accurately captures the essence of the cohort's engagement with interpreting modules surrounding the present study. These students typically enroll in interpreting courses for one or two semesters, primarily to enhance their foreign language skills and to acquire preliminary interpreting abilities that they perceive as beneficial for their future career prospects. This educational path is distinct from that of dedicated "interpreting learners," (Wu, 2016) who pursue extensive, often multi-year programs focused on mastering the art and skill of professional interpreting.

This nuanced understanding is crucial for situating the current research within the wider landscape of IS (Pöchhacker, 2016). The field has traditionally concentrated on the training and performance of individuals aiming for professional interpreting careers. However, there exists a significant, though less studied, subset of learners whose interaction with interpreting studies is part of a broader educational endeavor. By focusing on these "interpreting learners," the present research addresses a notable gap in the literature.

The inclusion of these interpreting learners in the current study contributes to a more comprehensive understanding of the diverse pathways through which individuals engage with interpreting studies. It challenges the field to broaden its perspective and consider the varying levels of commitment and objectives among students involved in interpreting activities. This broader view can inform the development of tailored educational strategies that cater to the diverse needs of students, from those seeking professional proficiency to those aiming to supplement their language skills and employability.

Moreover, by studying this under-researched group, the study contributes to addressing the "data famine" (Mellinger & Hanson, 2016) in areas of IS that pertain to non-professional, elective participants in interpreting education. This approach not only enriches the empirical base of the field but also encourages a more inclusive consideration of what constitutes interpreting studies and who its participants are.

Critical Thinking as a Core Component

Critical thinking is described as a higher-level skill closely associated with metacognition (Pietrzak, 2022, pp. 187-188). Definitions of critical thinking vary widely, but most definitions have the following abilities in common, based on classic and historic studies: scrutinizing arguments and opinions (Ennis, 1985;

Facione, 1990; Halpern, 1998; Paul & Nosich, 1992); drawing conclusions through inductive or deductive reasoning (Ennis, 1985; Facione, 1990; Paul & Nosich, 1992; Willingham, 2008); critiquing or assessing (Case, 2005; Ennis, 1985; Facione, 1990; Lipman, 1988; Tindal & Nolet, 1995); arriving at decisions or addressing problems (Ennis, 1985; Halpern, 1998; Willingham, 2008). In addition, there appear to be both general and domain-specific aspects of critical thinking, suggesting that instruction should be a blend of preparation in generic principles of critical thinking and practice in utilizing critical thinking skills in the context of varying domains (Ennis, 1985; Facione, 1990; Paul & Nosich, 1992). Martinez (2006) has defined critical thinking as "evaluating ideas according to their quality, especially judging whether they are useful or not" (p. 697), and treated it as one of the three kinds of metacognition, accompanied by metamemory and problem solving. Hennessey (1999) has presented an inventory of metacognitive skills that resemble the skills usually included in definitions of critical thinking: contemplating the fundamentals of one's beliefs; momentarily suspending one's ideas to evaluate opposing ideas; reflecting on the interplay between one's ideas and any evidence in or not in favor of those ideas; explicitly deliberating the standing of one's thoughts; appraising the consistency and generalizability of one's concepts.

Critical thinking is an essential skill for interpreting learners to develop (Gile, 2009; Pöchhacker, 2015; Tiselius & Hild, 2017), as it enables them to analyze and make decisions about the meaning of what they see and hear in real time. Without this ability, they will be at a disadvantage when asked to interpret spoken or written language (Sandoval, 1998). Consequently, critical thinking skills have been considered a crucial part of interpreter training programs (Horváth, 2007, p. 108). Further, Tseng and Gardner (2015) indicate that learner-centered learning or, in this case, interpreting learner-centered learning, helps to enhance critical thinking skills.

Several reasons explain why critical thinking capacities are crucial to successful interpreter training. First, critical thinking allows interpreters to analyze arguments and make inferences using logical reasoning (Gile, 2005; M. Liu, 2008). This is important because it enables interpreters to understand the meaning of what they are hearing or reading, and to draw conclusions based on that information. Second, critical thinking allows interpreters to judge or evaluate the quality of the information they are receiving (Seleskovitch, 1989), enabling interpreters to determine whether or not the information is reliable and accurate. Finally, critical thinking allows interpreters to make decisions or solve problems (Niska, 2005), a useful skill with which the interpreters are able to identify solutions to the challenges they face while interpreting.

This explains why interpreter training programs have generally included instruction relating to critical thinking skill development (Kalina, 2000, p. 7). This instruction has been designed to help interpreting learners develop the capability to analyze arguments, make inferences, judge or evaluate information, and make decisions or solve problems (Mackintosh, 1999). By teaching interpreting learners how to think critically, they become more effective interpreters who are better able to provide accurate and reliable interpretations (Li, 2015, p. 186).

Potential Interplays Between Critical Thinking and 1) Organization, 2) Metacognitive Self-Regulation, and 3) Peer Learning

Organization

Organization strategies are vital to interpreter training because they help learners think analytically about the materials they are interpreting (Dong, 2018;

Pöchhacker, 2016). When students can organizationally process information, they can better understand and remember the main notions of a text or conversation (Beeby et al., 2003, p. 46; Pintrich et al., 1991, p. 13). This is especially essential in interpreter training when students need to be able to remember and understand large amounts of information in a short period (Gile, 2005).

Many organization strategies can be used, such as outlining the key points of a text, sketching a network of the central concepts, or mapping the primary themes (Pintrich et al., 1991). Selecting the most appropriate organization strategy for a particular task can help improve learning and performance. For instance, when trying to remember a list of vocabulary words, it may be more effective to create a mind map or sketch a diagram of the words rather than simply reciting them from memory (D'Antoni et al., 2010).

Organization strategies can also help learners to think diagnostically about the materials they are processing (Huseman et al., 1972, p. 263). By actively selecting and organizing the information, students are more likely to pay attention to the meaning of the subject matters and see connections between ideas (Pintrich et al., 1991, p. 42). This is a valuable skill for interpreters, who need to be able to understand the meaning of what they are hearing and see the relationships between nodes of information to provide an accurate interpretation (Gile, 2009).

Duncan et al. (2015, p. 66) have shown evidence that organization strategies can have a positive effect on learning and performance. To illustrate, Gurung et al. (2010) have found that students who used organization strategies while studying for an exam performed better than those who did not use organization strategies. This suggests that organization strategies can help learners to think more deeply about the information they are trying to learn and remember, leading to better understanding and performance.

Organization strategies can be an advantageous tool for interpreting learners,

as they can help to improve learning and performance by promoting active engagement with the materials and encouraging critical thinking (Pöchhacker, 2016, p. 223). By using organization strategies, interpreting learners can better understand, remember, and think critically about the content they are interpreting (Kalina, 2000, p. 14).

Metacognitive Self-Regulation

Metacognition is often defined as "thinking about thinking" (Flavell, 1979, p. 906), while metacognitive self-regulation refers to the ability to monitor and regulate one's own cognitive processes in order to achieve a desired goal (Schunk, 2008; Zimmerman, 2008). For example, when studying for an exam, a metacognitively self-regulated learner would be aware of how well they are understanding the materials, what study strategies are most effective for them, and when to take breaks (Magno, 2010, pp. 149-152).

There is growing evidence that metacognitive self-regulation is a major factor in academic success (Pintrich, 1999; Schunk & Zimmerman, 2013). Metacognitive self-regulation has also been found to be related to higher levels of critical thinking (Kuhn et al., 1997). Given the importance of metacognitive self-regulation for academic success and critical thinking (Ku & Ho, 2010, p. 263), it is imperative to understand how metacognitive self-regulation can be promoted during interpreter training.

Further, metacognitive self-regulation, e.g., self-monitoring, can be promoted in several ways during interpreter training (Gile, 2009; Pöchhacker, 2015). One way is through the use of learning strategies. Learning strategies are specific actions that students can take to facilitate their own learning, e.g., using mnemonic devices, setting goals etc. (Weinstein et al., 2000). Metacognitive self-regulation is essential for the effective use of learning strategies (Dunlosky et al., 2013).

Metacognitive self-regulation can also be promoted through the use of

feedback (Doğan et al., 2009; Zimmerman & Moylan, 2009). Feedback is information that is provided to learners about their performance on a task (e.g., "You did not faithfully interpret that passage"). Feedback should be specific, timely, and useful in order to be effective (Shute, 2008, p. 154). This explains why a number of scholars (Aguirre Fernández Bravo, 2018; Araújo, 2019; Class & Moser-Mercer, 2013; Doğan et al., 2009) have specifically demonstrated the importance of feedbacking during interpreter training.

Peer Learning

Peer learning is defined as the process of acquiring knowledge or skills through discussion and collaboration with fellow students (Boud, 2001, p. 8; Pietrzak, 2022, pp. 109-111). Put differently, peer learning occurs when students work together to learn new materials or master new skills (Topping, 2005, p. 632). Peer learning has many benefits, including the possibility that it can help students better understand and remember information, develop critical thinking skills, and learn to work collaboratively (Boud et al., 2014; Damon, 1984).

Peer learning can take place in many different ways. For instance, students may discuss readings outside of class, work together on problem sets, or present their research to each other (Boud et al., 1999, 2014). In each of these cases, students are working together in order to learn new information or improve their understanding of the materials (Boud, 2001).

One of the most constructive values of peer learning is that it can help students develop critical thinking skills (Boud & Lee, 2005, p. 510). When students work together to discuss readings or solve problems, they are forced to think critically about the materials in order to come up with a solution (Cooper, 2002, p. 54). This process can help them better understand the materials and learn how to apply them in real-world situations (Azmitia, 1988).

According to Pintrich et al. (1991), peer learning can have a number of effects on critical thinking. For example, De Backer et al. (2015) suggest that exchanges of ideas and interactive brainstorms with peers can help students better understand and reinforce the materials they are reading. In addition, the activities of teamwork, exchanges of opinions, and dialogues with peers during the learning process can help students clarify and solidify the knowledge they are learning (Parr & Townsend, 2002). These activities typically occur in the context of cooperative learning as students engage in interactions with their peers within the group (Slavin, 1987).

In short, peer learning skills can have various effects on interpreter training, as they can help students make clear and elaborate on learning resources via peers (Gile, 2009; Pöchhacker, 2016).

Synthesis With the Work of Adnan et al. (2018)

As indicated previously, the work of Adnan et al. (2018) is pivotal in understanding how these elements combine within the context of higher education. Their findings suggest that organization, metacognitive self-regulation, and peer learning not only enhance motivational factors but are also foundational to developing robust critical thinking skills. These interrelationships underscore the necessity of a comprehensive educational strategy that integrates these dimensions to cultivate a rich, dynamic learning experience for interpreting learners.

Research Hypotheses

For developing and validating a scale with the four educational psychology constructs, the present study uses the research conceptual framework (Adnan et al., 2018) shown in Figure 2, while proposing four hypotheses as follows:

Hypothesis 1: Metacognitive self-regulation strategy is associated with critical thinking.

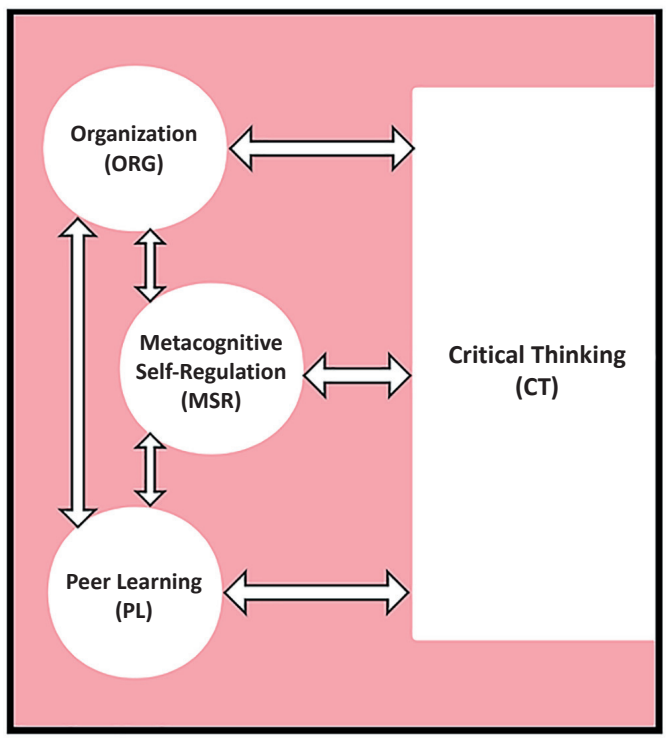
Hypothesis 2: Organizational strategy is associated with critical thinking.

Hypothesis 3: Peer learning strategy is associated with critical thinking.

Hypothesis 4: Organization, metacognitive self-regulation, peer learning and critical thinking all correlate with one another.

Figure 2

Research Conceptual Framework



Note. Adapted from Adnan et al. (2018)

Structural Equation Modeling

Structural equation modeling (SEM) is a statistical tool that is widely used in educational and psychological research, for a detailed discussion, see Bagozzi and Yi (2012), Khine (2013). It allows researchers to examine the interrelationships between various educational psychology or psychometric constructs in a way that is not possible with other methods (MacCallum & Austin, 2000). However, to date, little research has used the SEM techniques to analyze data in relation to interpreter-centered psychometric constructs. This is surprising given the potential benefits of SEM for understanding complex phenomena. SEM could potentially furnish valuable insights into the potential relationships amongst interpreters' psychometric constructs and improve our understanding of how these constructs influence each other, a point confirmed by Cai and Dong (2015).

The following are some of the few recent SEM studies that have been conducted to model the interactions amongst various interpreter-centered psychometric constructs. For example, Dong et al. (2013) recruited students from translation and interpreting degree programs and developed an interpreter anxiety scale using the SEM methodology. Also with degree program students recruited, L. Wang and Hsieh (2018) confirmed, with SEM analyses, that the self-schema of interpreting anxiety had an effect on interpreting flow and that interpreting flow had an effect on interpreting anxiety. Additionally, Yu and Dong (2022) investigated the effects of language competence and working memory capacity on consecutive interpreting performance via SEM. In addition, it is worth mentioning that the use of SEM in the field of "Translator Studies" is equally limited (Yang et al., 2021; Yang & Wang, 2019, 2020). In light of this, the current study is one of the first few attempts in IS to employ SEM to develop and validate a scale with the four constructs in question.

The use of SEM has many advantages over other methods (MacCallum & Austin, 2000) and has been considered an established approach in educational psychology research (Bagozzi & Yi, 2012; Khine, 2013). First, it allows for the modelling and the predicting of latent relationships between variables that are not possible with other methods (Kaplan, 2008). Second, it is conceivable to construct a model that represents the data in a way that is more understandable and easier to interpret. Third, the application of SEM makes it likely to suggest correlational or even causal relationships between variables (Kaplan, 2008). SEM could therefore potentially generate insightful information on the latent interplays between interpreter-centered psychometric constructs and improve our understanding of how these constructs influence each other. Thus, more research using SEM in relation to interpreter-centered psychometric constructs is needed in order to fully understand the potential of this approach to IS. The present research project is therefore significant as it pioneers the use of SEM to explore educational psychology constructs within interpreter training. By validating a new scale in this under-researched area, the study advances our theoretical and practical understanding of interpreter training dynamics.

Methodology

Participants

A total of 299 undergraduates who took tertiary interpreter training as an optional course in the greater Chinese-speaking region were successfully recruited; 232 females and 67 males in the age range 19-24 years voluntarily agreed to participate with informed consent. All were English or foreign language majors who had previously undertaken some non-degree training of interpreting, but had

received no formal BA- or MA-level interpreting instruction before the investigation. The native language of all the participants was Chinese, with English as the first foreign language.

It is worth stressing that the participant background information was obtained through a meticulous selection process to ensure the consistency and relevance of the sample for this study. During the data collection phase, interpreting professors and instructors across the various societies in the greater Chinese-speaking region were contacted via email and social media. These communications provided a detailed description of the desired participant profile: individuals who were English or foreign language majors with some non-degree training in interpreting but no formal BA- or MA-level interpreting instruction. The instructors were requested to pre-screen potential respondents based on these criteria.

Additionally, before completing the questionnaire, participants were required to self-identify and confirm their background to ensure they met the study's criteria. This dual-layered approach of instructor pre-screening followed by participant self-identification was designed to ensure a consistent and relevant participant group, thereby enhancing the reliability and validity of the research findings.

Instruments

From the original Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991), a total of 23 questions are associated with the four dimensions, i.e., 1) Critical Thinking or CT; 2) Organization or ORG; 3) Metacognitive Self-Regulations or MSR; and 4) Peer Learning or PL. That being said, using the Delphi method (Okoli & Pawlowski, 2004), results from a panel of three interpreting professors excluded six questions that were considered irrelevant to the study, e.g., 1) I always miss out important information because I think of other things; 2) I find what I read confusing; and 3) I make up questions to help

myself understand better (Okoli & Pawlowski, 2004, p. 23). Ultimately, an online questionnaire with a new title of "Motivation and Strategies in Interpreting Learning" containing 23 questions (Appendix) was administered to the participants. The questionnaire comprises six demographic questions, followed by Questions 7-10 relating to ORG, Questions 11-16 addressing MSR, Questions 17-19 focusing on PL, and Questions 20-23 pertaining to CT. All of the items were measured by a four-point Likert-scale, ranging from 1 as strongly disagree to 4 as strongly agree. The decision to utilize a 4-point Likert scale, as opposed to the original 7-point scale used in the MSLQ, was made after careful consideration by the said three interpreting professors. This adjustment was strategically implemented to enhance the response quality by eliminating the middle, or "neutral," option, which can often lead to non-discriminative responses. The absence of a neutral option encourages respondents to make a more definitive judgment, thereby providing clearer data on their leanings toward agreement or disagreement with the questionnaire statements. Further, the choice of a 4-point scale also aimed to reduce respondent fatigue and the cognitive load associated with discerning between closely related response options that a 7-point scale presents. This is particularly important in ensuring higher response rates and reliability in contexts where nuanced differentiation between options may not yield additional valuable insights.

"Organization" included four items (Pintrich et al., 1991) on how interpreting learners organize learning materials while preparing for the interpreting training course. The dimension on "metacognitive self-regulation consisted of six items" (Pintrich et al., 1991) on the extent to which tertiary interpreting learners use metacognitive learning strategies when they prepare for their interpreter training. The dimension on "peer learning" included three items (Pintrich et al., 1991) on how the learners use peer learning for the tertiary interpreting training course. The dimension on "critical thinking" included four items (Pintrich et al., 1991) on how

the learners apply critical thinking to the tertiary interpreting training course.

It is worth noting that the categorization of items ORG 2 and ORG 3 (see Appendix) within the current questionnaire, which originally appeared under different categories in the MSLQ. This reclassification reflects a deliberate and theoretically informed decision, akin to adaptations noted in previous research across diverse academic disciplines (Alsultanny et al., 2014; Hadwin et al., 2007; van Rooij et al., 2017). Such flexibility in the application of the MSLQ items is not only common but is encouraged to ensure the relevance and applicability of the instrument to specific study contexts.

In the present study, the unique requirements of interpreter training necessitated a nuanced approach to item selection and categorization. The decision to adapt and reposition these items under the organization dimension was reached after thorough discussion and consensus among three senior interpreting professors. This was done to more accurately reflect the specific organizational skills required in interpreter training, which includes effective time management ("For this interpreting class, I make full use of my time to study") and collaborative preparation strategies ("When preparing for interpreting in advance, I often make time to discuss what I have prepared with other students in the class"). These adaptations were made to tailor the questionnaire more closely to the skills and behaviors most predictive of success in interpreter training.

Results and Findings

Descriptive Results

Of the 299 participants, around 78% of the participants were female, while the remaining 22% were male. Their average age was 21.6 with a standard deviation of

1.7. Prior to the investigation, the participants self-reported that they had spent an average of 13 years learning English as a foreign language a standard deviation of 2.9, and that they had spent an average of 2.6 hours per week a standard deviation of 1.6 on their optional interpreting courses at universities and colleges in the respective five Chinese-speaking societies. As previously indicated, the participants were from five different societies in the greater Chinese-speaking region: Chinese Mainland, Hong Kong, Macau, Singapore, Taiwan (arranged alphabetically). Specifically, the participants' universities are located in the following cities: Shanghai (141), Xiamen (11), Guangzhou (6), Shenzhen (5), Beijing (5), Changsha (5), Zhuhai (1), Zhanjiang (2), Chengdu (2), Nanjing (1), Hangzhou (1), Taiyuan (1), Kunming (1), Hong Kong (4), Macau (18), Singapore (9), New Taipei City (35), Taipei City (29), Tainan (9), Kaohsiung (12), and Hsinchu (1). This distribution reflects a significant concentration in major metropolitan areas, indicating the prevalence of interpreter training programs in urban centers. In addition, the participants are, on a relative basis, well-distributed across the greater Chinese-speaking region, including significant representation from Chinese Mainland, Taiwan, Macau, and Singapore. This diversity enhances the relative generalizability of our findings across different socio-cultural contexts within this region. Finally, it is important to note that the study gave the same instructions in English regarding the specific linguistic background during participant recruitment, independent of the different societies involved. Finally, the top two self-reported reasons why the participants studied the optional interpreting module were 1) I find interpreting skills useful; and 2) Interpreting skills can improve my English proficiency.

Results of Correlation Analysis

A correlation analysis was performed to examine the relationships among the four key constructs: Critical Thinking (CT), Organization (ORG), Metacognitive

Self-Regulation (MSR), and Peer Learning (PL). The analysis revealed that all four factors are positively correlated with one another, indicating that improvements in one factor could be associated with enhancements in the others.

Table 1 presents the means, standard deviations, and correlation coefficients for each of these constructs. As shown, the results underscore the interrelated nature of these cognitive skills, which are crucial for the development of interpreting students' abilities. It is worth mentioning that CT showed strong associations with ORG, MSR, and PL, suggesting its pivotal role in the cognitive framework of interpreting learners. In addition, ORG was positively correlated with MSR and PL, highlighting its importance in structuring and enhancing learning processes. Further, MSR and PL were also significantly correlated, reflecting the complementary roles these factors play in fostering an interactive and reflective learning environment.

Table 1

Results of Correlation Analysis

Measures	1	2	3	4
1. Organization (ORG)	1			
2. Metacognitive Self-Regulation (MSR)	0.70**	1		
3. Peer Learning (PL)	0.59**	0.66**	1	
4. Critical Thinking (CT)	0.60**	0.71**	0.57**	1
M	2.85	2.88	2.71	2.94
SD	0.37	0.36	0.53	0.35

Note. ** indicates significance at the 0.01 level (2-tailed).

The analysis revealed that the mean scores for the four key constructs were as follows: Organization had a mean of 2.85, metacognitive self-regulation a mean of 2.88, peer learning a mean of 2.71, and critical thinking a mean of 2.94. These

results indicate that the interpreting learners recognized the importance of each of these cognitive skills in their training. The relatively close range of these mean scores suggests a general agreement among the learners about the significance of these skills in enhancing their interpreter training experience.

Specifically, the results lead to findings suggesting that to optimize their learning outcomes in interpreter training, the interpreting learners need to focus on several key strategies:

1) Effective Organization: Learners need to effectively organize their study materials and information. A well-structured approach to learning helps in better understanding and retention of the interpreting content, enabling learners to manage and navigate through the learning materials more efficiently.

2) Metacognitive Self-Regulation: It is crucial for learners to utilize metacognitive regulation strategies effectively. This involves being aware of their own learning processes and adapting their strategies as needed to improve comprehension and mastery of interpreting skills.

3) Peer Learning: The use of peer learning strategies is essential for reinforcing the learning experience. By collaborating with and learning from their peers, interpreting students can enhance their understanding of interpreting techniques and practices through shared knowledge and experiences.

4) Application of Critical Thinking: Learners must apply critical thinking throughout their training process. This involves analyzing, evaluating, and synthesizing information during interpretation exercises, which are key to developing professional-level interpreting skills.

These components underscore the holistic approach needed in interpreter training, where organization, metacognitive self-regulation, peer learning, and critical thinking play integral roles in shaping the learners' professional development and readiness.

Moreover, the standard deviations for these factors ranged from 0.35 to 0.53, demonstrating moderate variability in the participants' responses. Specifically, Organization had a standard deviation of 0.37, Metacognitive Self-Regulation 0.36, Peer Learning 0.53, and Critical Thinking 0.35. This variability is important as it shows that while there are commonalities in how skills are perceived and developed, individual differences are still significant.

The correlation analysis revealed meaningful relationships among the four factors. The correlation coefficient between ORG and MSR was $r = 0.70$, indicating a strong positive relationship. This suggests that students who are well-organized also tend to be good at regulating their learning processes. The correlation between MSR and PL was $r = 0.66$, and between MSR and CT, it was $r = 0.71$. These coefficients indicate that metacognitive strategies are closely linked with both the ability to engage with peers and the capacity for critical thinking.

These correlations support Hypothesis 4, which posited that the constructs of ORG, MSR, PL, and CT are interrelated. The positive and significant correlations among these factors confirm that these cognitive skills are not isolated but are interconnected components of the cognitive skillset of interpreting learners.

Results of Standardized Factor Loading for All Factors

First, to examine the internal consistent reliability of the observed items in the questionnaire so as to validate the scale, Cronbach's alpha values were assessed. The resulting alpha values ranged from 0.58 to 0.74, which were above the acceptable threshold (Tavakol & Dennick, 2011), as shown in Table 2.

That being said, it is worth noting that, in the present study, the internal consistency of the scales, as measured by Cronbach's alpha, ranged from 0.58 to 0.74. While the alpha values for most constructs are above the commonly accepted threshold of 0.70 (Tavakol & Dennick, 2011), indicating good internal consistency, the alpha value for the "Organization" construct is 0.58. This value is below the 0.70

threshold, which suggests potential issues with the reliability of this particular scale.

To illustrate, Cronbach's alpha is a measure of internal consistency and reflects how closely related a set of items are within a group. It is widely recognized that alpha values above 0.70 are preferable, indicating a higher level of internal consistency (Raykov & Marcoulides, 2011). However, values slightly below this threshold can still be acceptable in exploratory research or when dealing with complex constructs (Hair, 2009).

Therefore, it has to be acknowledged that the lower alpha value for the "Organization" construct suggests that some items may not be measuring the same underlying construct as effectively as others. This discrepancy could be due to the diverse nature of skills and behaviors encompassed by the "Organization" dimension or the specific characteristics of the sample involved in this study. To address this, future research is recommended to incorporate further refinement of the scale, and additional validation work is needed to improve the internal consistency of the "Organization" construct.

To enhance the robustness of the findings and ensure the scale's applicability across various contexts, future studies should consider revising the "Organization" scale. This could involve conducting additional pilot testing, item analysis, and incorporating qualitative feedback to improve the scale's internal consistency and better capture the construct it intends to measure.

Consequently, while the current study presents preliminary evidence for the reliability of the newly developed scale, the results, particularly concerning the "Organization" dimension, should be interpreted with caution. These findings underscore the necessity for continued scale development efforts to ensure the comprehensive assessment of all targeted constructs.

Second, in order to test the reliability and validity of the measurement model, standardized factor loadings, composite reliability (CR) (Segars & Grover, 1993), and average variance extracted (AVE) (Fornell & Larcker, 1981) (Table 2). The

standardized factor loadings for all the factors were significant and adequate. The CR values have revealed that the factors were reliable and the AVE values have verified the validity of the factors. Overall, the items were valid and reliable, and hence the confirmed validity and reliability of the scale the study aimed to develop at the outset.

Table 2

Standardized Factor Loading for the Measurement Model (For The Detailed Questionnaire, See Appendix)

Items	Factor Loading	Cronbach's Alpha	CR	AVE
Organization (ORG)		0.58	0.62	0.30
1. ORG 1	0.41			
2. ORG 2	0.45			
3. ORG 3	0.60			
4. ORG 4	0.68			
Metacognitive Self-Regulation (MSR)		0.75	0.77	0.36
1. MSR 1	0.64			
2. MSR 2	0.50			
3. MSR 3	0.71			
4. MSR 4	0.55			
5. MSR 5	0.56			
6. MSR 6	0.61			
Peer Learning (PL)		0.74	0.76	0.53
1. PL 1	0.58			
2. PL 2	0.75			
3. PL 3	0.82			
Critical Thinking (CT)		0.65	0.66	0.33
1. CT 1	0.70			
2. CT 2	0.53			
3. CT 3	0.39			
4. CT 4	0.64			

Results of Multiple Regression Analysis

According to a multiple regression analysis for Critical Thinking (Table 3), organization correlated with critical thinking (β = 0.49, $p < 0.01$), supporting hypothesis 1. Further, metacognitive self-regulation was associated with critical thinking (β = 0.17, $p < 0.01$), supporting hypothesis 2. Finally, peer learning also correlated with critical thinking (β = 0.15, $p < 0.01$), supporting hypothesis 3. This means that Hypotheses 1, 2, and 3 have all been supported and verified.

Table 3

*Multiple Regression Analysis for Critical Thinking (** = p < 0.01)*

Variables	β	Overall R^2
Organization (ORG)	0.49**	
Metacognitive Self-Regulation (MSR)	0.17**	
Peer Learning (PL)	0.15**	
		53.2

Note. All significant, p < 0.01

Measurement Model and the Structural Model

Prior research (Browne & Cudeck, 1992; Jöreskog & Sörbom, 1993) demonstrates that an Root Mean Square Error of Approximation (RMSEA) value of < 0.05 indicates a "close fit." While depicting the measurement model, Figure 1 shows that the RMSEA was 0.077, indicating a good model fit with CT as the validity criterion alongside ORG, MSR and PL as dimensions whose criterion-related validities were assessed. Thus, the recommended thresholds and measurement model fitness results have revealed a good model fit for the

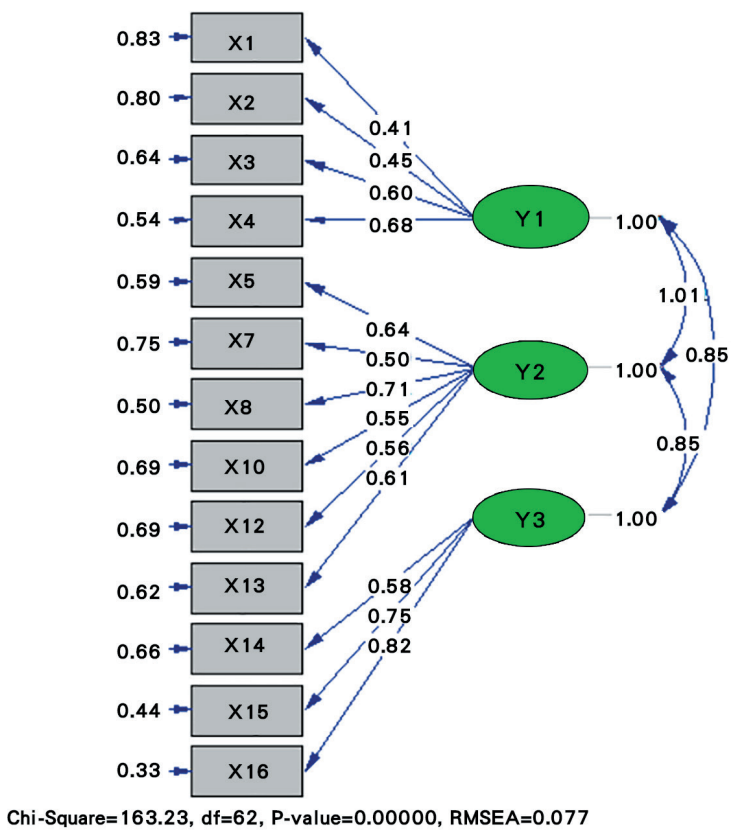
educational psychological constructs in question.

Analysis of Path Coefficient

Concurrently, with CT as the validity criterion, and ORG, MSR and PL as accompanying dimensions, the path coefficients of the structural model were then estimated based on the measurement model's good fit. The path coefficient analysis results are also pictorially shown in Figure 3, further confirming the reliability and validity of the scale.

Figure 3

Goodness of Fit Statistics



Discussion

The results and findings of this study substantiate the hypothesis that educational psychology constructs such as organization, metacognitive self-regulation, and peer learning are significantly and positively correlated with critical thinking among tertiary interpreting learners in higher education. This finding aligns with the theoretical frameworks proposed by Tiselius and Dimitrova (2023), who emphasized the integral role of cognitive and metacognitive processes in the development of interpreting competence in varying contexts. The presented study extends this framework by demonstrating that not only are these constructs interrelated, but they collectively contribute to the enhancement of critical thinking skills, which are pivotal for interpreting learners.

Moreover, the observed interconnections among the four constructs—organization, metacognitive self-regulation, peer learning, and critical thinking—echo the dynamic and interactive learning environments described by Orlando (2019) and Sawyer (2019) in interpreter education. These environments foster an integrated approach to skill development, as supported by the findings. By linking these constructs, the present research contributes to a deeper understanding of how structured and collaborative learning strategies can be effectively implemented to bolster critical thinking, as observed in practical interpreting classrooms by Palazzoni (2024). This approach underlines the importance of a holistic educational strategy that leverages various cognitive and metacognitive strategies to optimize learning outcomes for interpreting students, moving beyond the traditional, more prescriptive training models.

What these findings suggest is that it is important to note that all four constructs are to a certain extent equally important in higher education tertiary interpreter training. This is because each construct plays a unique and essential role

in the overall interpreter training process. For example, organization helps students keep track of their studies and plan their workload in an efficient manner (Pöchhacker, 2015). Metacognitive self-regulation enables students to monitor and adjust their own learning strategies according to their needs and progress (Doğan et al., 2009). Peer learning provides students with the opportunity to learn from and collaborate with their peers (Cao, 2017), while critical thinking allows them to reflect on and evaluate information in a systematic way (Niska, 2005). Therefore, all four constructs are interrelated and interdependent, and this suggests each one contributes to the overall quality of tertiary interpreter education. Therefore, interpreter educators should consider all of these factors when designing learning activities and assessment tasks (Gile, 2009; Kalina, 2000; Pöchhacker, 2015).

It is worth stressing again that the findings furnished by the study underscore the interconnectedness of the four constructs—organization, metacognitive self-regulation, peer learning, and critical thinking—and their collective importance in higher education interpreting training. Organization is not merely about maintaining order; as Angelelli (2004) and Riccardi (2005) have observed, it is pivotal for helping students systematically approach interpreting tasks, enhancing their ability to manage and synthesize large volumes of information efficiently. This organizational skill is crucial, as it supports the cognitive and metacognitive processes central to interpreting (Setton & Dawrant, 2016). Metacognitive self-regulation, as outlined by Shreve and Angelone (2010), goes beyond simple self-monitoring, empowering students to adaptively adjust their strategies in response to the dynamic demands of interpreting, thereby fostering resilience and strategic learning as noted in the work of Bontempo and Napier (2011).

Peer learning, highlighted by Cao (2017), extends beyond collaborative learning, serving as a catalyst for social and cognitive development, as it allows students to explore different perspectives, challenge their thinking, and refine their

techniques in a supportive environment (Napier, 2004). This collaborative approach is in line with Vygotsky and Cole's (1978) theories, where peer interaction plays a critical role in the development of higher-order thinking skills. Critical thinking, essential for interpreters, involves more than the application of logical reasoning; it includes the evaluation of information and arguments, reflection on one's own thought processes, and the integration of diverse sources of knowledge, as emphasized by Pöchhacker (2016) and Riccardi (2005). This holistic approach to critical thinking is crucial for developing the professional judgment and decision-making skills necessary for interpreters, as described by Seeber (2011).

Additionally, in light of the findings furnished by the study, it is suggested that each construct contributes significantly to the comprehensive development of interpreting students. Educators must, therefore, integrate these elements into their pedagogical frameworks to enhance the efficacy and depth of interpreter training. Such integration not only aligns with the theoretical underpinnings of effective learning strategies but also responds to the practical, observed needs of interpreting students in diverse classroom settings. By doing so, a more robust, reflective, and adaptive learning environment can be potentially fostered to prepare students for the complex realities of the interpreting profession.

Further, the presented study suggests that organization, metacognitive self-regulation, and peer learning are not just peripheral elements but central to the development of critical thinking skills during interpreter training. This is consistent with the findings of Gile (2009) and Pöchhacker (2016), who noted that structured learning strategies and cognitive frameworks are vital in nurturing the analytical and evaluative capacities of interpreting students. The SEM results demonstrate a significant positive correlation between the three factors—organization (ORG), metacognitive self-regulation (MSR), and peer learning (PL)—and critical thinking (CL). This correlation suggests that well-structured learning strategies such as

organization and metacognitive self-regulation can directly contribute to enhancing critical thinking skills. For instance, as Witter-Merithew and Johnson (2004) observed in interpreting classrooms, students who employed systematic organization in their learning activities were more adept at critical analysis and decision-making, essential components of effective interpreting.

Moreover, this study's results align with Z. Y. Lee and Liao (2023), who argue that the development of critical thinking is reciprocal with learning strategies: As students enhance their organizational and metacognitive strategies, their capacity for critical thinking improves, and vice versa. This reciprocal relationship creates a feedback loop, where improved critical thinking fosters deeper engagement with learning strategies, which in turn further enhances critical thinking. Such a cycle is evident in interpreting training, where, as Angelelli (2006) points out, the iterative process of refining interpretative strategies under the guidance of peer feedback and self-regulation leads to progressively more sophisticated critical thinking. This dynamic interplay underscores the importance of integrating structured learning strategies into interpreter training programs to cultivate a holistic and reflective learning environment.

In addition, this study contributes to the field by developing and validating a multidimensional scale that integrates four key educational psychology constructs—organization, metacognitive self-regulation, peer learning, and critical thinking. These constructs have been shown to interrelate and mutually enhance each other within the cohort of tertiary interpreting learners. For instance, research by Doğan et al. (2009) highlights that well-structured organization and metacognitive strategies significantly predict better learning outcomes in interpreting training, supporting the findings that these constructs are interconnected and amplify each other's effects.

Furthermore, W. Wang et al. (2020) have demonstrated in their observational

studies of interpreting classrooms that peer learning, when effectively integrated with structured metacognitive strategies, can lead to substantial improvements in students' critical thinking abilities. This aligns with my observation that organization, metacognitive self-regulation, and peer learning can collectively enhance critical thinking, suggesting a synergistic effect where each factor supports the others, enhancing the overall learning experience. This holistic approach is crucial, as noted by Pöchhacker (2016), who argues that interpreting studies must move beyond isolated skill training to embrace integrated cognitive and metacognitive strategies. By establishing this scale, my study lays the groundwork for future research to explore deeper interrelationships among these constructs and others within the realm of interpreter training, paving the way for more nuanced and effective training methodologies that address the complex dynamics of learning and cognition in interpreter education.

Finally, the application of SEM in the presented study has demonstrated its significant potential in unraveling the complex interplay among psychometric constructs centered on interpreter training. This approach aligns with the work of scholars like Mellinger and Hanson (2016), who emphasize SEM's capability to provide a nuanced understanding of how various educational psychology constructs influence interpreter performance. By highlighting the interconnectedness of organization, metacognitive self-regulation, and peer learning with critical thinking, my analysis not only supports but also extends previous findings (Gile, 2009; Pöchhacker, 2016), which suggest that structured, reflective learning processes are crucial in developing the cognitive and metacognitive skills essential for interpreters.

Also, the study enriches the interpretative training literature by providing empirical evidence that aligns with classroom observations of Bontempo and Napier (2011), who noted the dynamic interdependencies of cognitive skills in

shaping interpreting competencies. This reinforcement of theory through empirical data helps bridge the gap between theoretical frameworks and practical, observable outcomes in educational settings. The inclusion of peer learning, in particular, resonates with Kiraly's (2014) social constructivist approach, which argues that collaborative learning environments are key to fostering the holistic development of interpreting students. By systematically demonstrating these relationships, the study contributes to a more comprehensive understanding of the pedagogical strategies that can enhance the efficacy of interpreter training programs, advocating for a balanced integration of theoretical knowledge and practical application.

Conclusion and Limitations

Conclusion

In conclusion, this study has elucidated the complex interrelationships among organization, metacognitive self-regulation, peer learning, and critical thinking within the context of higher education interpreting learners. By developing and validating a robust questionnaire scale and employing SEM, my research contributes to a deeper understanding of how these key educational constructs interact and influence each other (Gile, 2009; Pöchhacker, 2016).

My findings align with previous research indicating that well-structured pedagogical strategies can significantly enhance the acquisition of critical thinking and other cognitive skills among interpreting learners (Kurz, 2002; Sawyer, 2019). For instance, the positive correlations we identified between organization, metacognitive self-regulation, and critical thinking echo the work of Shreve and Angelone (2010), who emphasize the transformative potential of metacognitive

strategies in interpreter training. Furthermore, my study extends the discourse on peer learning's role in fostering collaborative and reflective learning environments, as discussed by Boud et al. (2014).

The application of SEM has provided a rigorous methodological framework to understand these dynamics, suggesting that the relationships among the constructs are multidimensional and robust. This approach has underlined the necessity for further explorative research to refine these scales and to broaden their application in diverse educational settings (Schwieter & Ferreira, 2017).

Ultimately, the scale developed in this study offers interpreter educators and trainers a valuable tool for assessing and enhancing the pedagogical strategies that support interpreting learners' development. It invites a more nuanced application of these strategies to foster environments where critical thinking and other key skills are actively cultivated (Setton & Dawrant, 2016). Future research should continue to expand on these findings, exploring how these constructs can be integrated into comprehensive models of interpreter education that respond to the evolving needs of the profession.

By integrating these insights and approaches, this study not only advances theoretical understanding but also provides practical frameworks for enhancing teaching and learning in interpreter education. The presented work underscores the importance of continued exploration and dialogue within this field to fully harness the potential of these educational constructs in shaping competent interpreting professionals.

Limitations

This study has a number of limitations. First, the sample size was moderately small, and may not be representative of the population of interpreting learners in

the greater Chinese-speaking region. Second, the study only investigated the interrelationships amongst the four constructs, and did not address the issue of how these factors may potentially influence interpreter performance. It is recommended that future research should address these limitations in order to further our understanding of the associations amongst other constructs closely related to interpreter training in higher education.

Pedagogical Implications and Future Research

The implications and novel contributions to knowledge by the present study manifest in multiple ways. First, methodologically, the current study is one of the first few evidence-based studies (M. Liu, 2011) in IS to apply SEM to the investigation of the potential interrelationships amongst the four major factors. Second, ontologically, the study may yield insights into potential interplays amongst the factors within the under-researched population of tertiary interpreting learners in higher education. Third, to enhance the robustness of our findings and ensure the scale's applicability across various contexts, future studies should consider revising the "Organization" scale. This could involve conducting additional pilot testing, item analysis, and incorporating qualitative feedback to improve the scale's internal consistency and better capture the construct it intends to measure. Consequently, while the current study presents preliminary evidence for the reliability of the newly developed scale, the results, particularly concerning the "Organization" dimension, should be interpreted with caution. These findings underscore the necessity for continued scale development efforts to ensure the comprehensive assessment of all targeted constructs. Finally, epistemologically, results and findings from the study may to a certain extent inform the new sub-area

of "metacognitive interpreter studies" within IS. The study may therefore have major social impacts on the way tertiary interpreting learners in higher education are assessed. This could essentially lead to an improved questionnaire scale and, hence, a better insight into interpreting learners' differing psychometric states, leading to a potentially valuable social impact on quality education championed by the United Nations Sustainable Development Goal 4 or SDG 4 (Ferguson & Roofe, 2020; Sayed & Moriarty, 2020).

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Appendix

Questionnaire: Motivation and Strategies in Interpreting Learning

Dear Participant,

This is Vincent Chieh-Ying Chang, Department of English, Tamkang University, New Taipei City, Taiwan. Thank you for participating in this study. The following questionnaire aims to assess your motivation and strategies in learning interpreting. Your responses will potentially yield valuable insights into the educational practices and training methodologies in the field of interpreting. Please indicate your level of agreement with each question using the following four-point Likert scale, where 1 represents "strongly disagree"; 2, "disagree"; 3, "agree"; and 4, "strongly agree". Your participation is voluntary and your responses will be kept strictly confidential. Thank you so much for your time and participation. Should you have any queries or concerns, please feel free to contact me at 159738@o365.tku.edu.tw.

Demographic Questions:

1. Gender: Female Male
2. Age (Please enter your age as a number.):
3. How many years have you spent learning English as a foreign language?
4. How many hours of interpreter training per week do you do in your university?
5. In which city is your university located?
6. For what reason(s) did you decide on taking up this elective interpreter training course?

Questions on Motivation and Strategies in Interpreting Learning

Please indicate your level of agreement with each of the following question using the following four-point Likert scale, where 1 represents “strongly disagree”; 2, “disagree”; 3, “agree”; and 4, “strongly agree”.

7. When preparing background material before an interpreting class, I take down notes or use an online database to help me organize my thoughts.
8. For this interpreting class, I make full use of my time to study.
9. When preparing for interpreting in advance, I often make time to discuss what I have prepared with other students in the class.
10. When preparing for interpreting in advance, I try to connect the information I’ve prepared with what I already know.
11. In the process of preparing for the interpreting class, I will deliberately ask myself questions to help me focus and prepare for the class.
12. When preparing for interpreting in advance, if the content of the preparation is difficult to understand, I will change the way I prepare.
13. When preparing for interpreting in advance, if I experience problems looking for information, I will change the way I search for information.
14. To the best of my ability, I link the topics, knowledge or skills taught during interpreter training to the topics, knowledge or skills taught in other courses.
15. For this interpreting class, I will set goals, and then according to the goals, I will arrange other activities during my study accordingly.
16. When I come across new information in an interpreting class, if I write down notes while still feeling confused, I will sort out the interpreting notes afterwards.
17. During my interpreting training, I often try to explain the background knowledge of a topic to my classmates or friends.

18. When preparing for interpreting in advance, I will work with other students in this interpreting class to complete the pre-class preparation and practice with my classmates during the class.
19. When preparing for interpreting in advance, I often make time to discuss what I have prepared with other students in the class.
20. If I hear any theory, interpretation, or conclusion in class or during preparation, I will consider if there is good evidence to support it.
21. When preparing for interpretation in advance, I will use the prepared content as a starting point, and try to extend my ideas based on the content I have prepared.
22. I will connect what I have learned in the interpreting class with my own thoughts.
23. In this interpreting class, when I come up with or hear any statement or conclusion, I will think if there are other potentially different viewpoints.