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Towards deeper learning in EMI lectures: the role of English proficiency and motivation in students' deep processing of content knowledge

Sihan Zhou [a], Daniel Fung [b] and Nathan Thomas [c]

[a]Department of Curriculum and Instruction, Faculty of Education, The Chinese University of Hong Kong, Hong Kong SAR, China; [b]Faculty of Education, The University of Hong Kong, Pokfulam, Hong Kong SAR, China; [c]IOE, UCL's Faculty of Education and Society, London, UK

ABSTRACT

Internationalisation trends in higher education have catalysed the rapid growth of English medium instruction (EMI). A central question in EMI research is whether students can process content knowledge in depth when it is taught through a language that they have limited proficiency in. Previous studies have primarily examined the impact of EMI on content learning products (e.g. academic grades) with few investigations into learning processes. The present study explores the extent to which students report using deep-level strategies (e.g. elaboration, organisation, and critical thinking) for processing content knowledge in EMI lectures, and whether such strategy use is related to students' English listening proficiency and motivational beliefs. A mixed-methods design was used, collecting questionnaire responses from 316 students and conducting semi-structured interviews with a subsample of 35 students at an EMI university in China. The findings highlight students' self-efficacy and intrinsic learning goals as stronger predictors of deep processing strategy use than listening proficiency. Low-proficiency students were found to engage in more laborious previewing than their highly proficient peers. Such previewing appeared to help them develop schemata for activating in-class deep processing of content. The study offers implications for programme designers and lecturers on scaffolding meaningful content learning in EMI settings.

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English medium instruction; learning strategies; motivation; English proficiency; lecture listening

Introduction

English medium instruction (EMI) has expanded rapidly in higher education due to global internationalisation trends (Galloway, Kriukow, and Numajiri 2017; Sahan et al. 2021; Wächter and Maiworm 2008, 2014; Yuan et al. 2022; Zhou et al. 2022). Since EMI refers to using English to teach academic subjects in 'countries or jurisdictions where the first language of the majority of the population is not English' (Macaro et al. 2018, 37), students in EMI programmes are usually bi/multilingual with a first/primary language (L1) other than English. As such, concerns have been voiced over whether these students are able to develop content knowledge in depth via English – a language that students may only have limited proficiency in.

CONTACT Nathan Thomas nathan-thomas@ucl.ac.uk

Studies that have investigated the impact of EMI on academic performance have reported mixed findings. For example, some studies have found little to no difference in learning outcomes between EMI and L1-medium courses (e.g. Aizawa 2023; Dafouz, Camacho, and Urquia 2014; Joe and Lee 2013; Teng and Lei 2021), while others have identified a negative effect of EMI on content learning (e.g. Arco-Tirado et al. 2018; Li 2018). Within classrooms, students were found to struggle with comprehending the deeper meaning of lectures even if they could understand the surface meaning of every sentence (Ding and Stapleton 2016). Many students in such contexts only provided simple responses to teachers' questions without evidence of using higher-order thinking skills (Hu and Duan 2019). Students also perceived the depth of knowledge processed through EMI as much shallower than that learnt through their L1 (e.g. Kim and Yoon 2018; Kırkgöz 2005). These studies call for more research on the *process* of students' learning of content knowledge within EMI classrooms – not just the *product* (i.e. academic grades) – so as to inform pedagogical support for more effective learning.

The current study explores students' use of deep processing strategies when listening to EMI lectures. Compared to surface-level strategies (e.g. rote memorisation), deep-level strategies are more cognitively demanding but can help students process information more meaningfully through organising, connecting, and evaluating knowledge (Marton and Säljö 1976; Panadero et al. 2021; Phan 2009; Pintrich 2004). In education research, students' use of deep processing strategies has been found to relate closely to their motivational beliefs such as self-efficacy (Fenollar, Román, and Cuestas 2007; Neuville, Frenay, and Bourgeois 2013; Phan 2009), goal orientation (Ames and Archer 1988; Pintrich and Schunk 2002), and task value (Neuville, Frenay, and Bourgeois 2013). In EMI lectures, however, the extent to which students can process subject matter in depth might also be influenced by their English proficiency, as researchers have found that learners' listening comprehension is usually influenced by their proficiency or linguistic resources in that language (e.g. Fung and Macaro 2021; Goh 2002; Goh and Hu 2014; Graham, Santos, and Vanderplank 2010; O'Malley, Chamot, and Kupper 1989; Vandergrift 2003). Students with higher English proficiency might be more capable of overcoming linguistic barriers, and thus could have more cognitive capacity to allocate to the use of deep-level strategies for processing content. To enrich our understanding of how students process content in EMI lectures, this study investigates students' use of deep processing strategies, and examines how English proficiency and motivation may impact their strategy use.

Background to the study

Deep processing of content in EMI lectures

According to cognitive load theory, the quality of learning is affected by the number of interactive information elements that learners need to process simultaneously (Sweller, Ayres, and Kalyuga 2011). Since EMI lectures involve interactional information presented in a second language (L2) simultaneously consisting of new content, students must contend with a high cognitive load to process such information with limited working memory (Hu and Duan 2019; Jiang and Zhang 2019). Indeed, research in the past two decades has documented numerous difficulties reported by students in understanding EMI lectures, such as being unable to follow teachers' line of thought (Hellekjær 2010), a lack of interaction (Airey and Linder 2006; Dafouz and García 2013), and exhaustion leading to loss of attention (Aizawa and Rose 2020). Drawing on interviews and learning journals, Ding and Stapleton (2016) reported that students in EMI classes felt unable to comprehend the deeper meaning of lectures, despite understanding every sentence the teacher said. Similarly, Hu and Duan (2019) recorded EMI lessons and found that students often produced responses of low-level cognitive complexity that reflect remembering, understanding, and applying knowledge, rarely providing responses indicative of higher-order thinking such as analysing, evaluating, and creating knowledge.

These studies have raised concerns regarding the depth of students' processing of content knowledge in EMI lectures. In education research, students' use of *deep* versus *surface* learning has been found to result in differences in their academic performance (e.g. Phan 2009; Simons, Dewitte, and Lens 2004). Adapting Marton and Säljö's (1976) seminal definitions, in the current study, we define deep processing strategies as strategies directed towards the intentional content of the listening material (i.e. processing semantic and latent meaning), and surface-level strategies as strategies focused on comprehending the listening text itself. Learners adopting deep processing strategies tend to use strategies such as summarising main ideas, structuring the discourse, and linking new information to prior knowledge (Panadero et al. 2021; Pintrich 2004). Those favouring surface strategies are prone to using rote-learning strategies that hinder further analysis, for example, shallow memorisation and rehearsal (Dinsmore 2018).

An emerging area of research on how students cope with cognitively demanding EMI lectures has called for fostering strategic listeners to deepen their understanding of content knowledge (e.g. Fung and Lo 2023; Macaro et al. 2019; Soruç and Griffiths 2018; Zhou and Rose 2021; Zhou and Thompson 2023a). Drawing on stimulated recall interviews, Macaro et al. (2019) found that students used note-taking strategies in conjunction with lecture slides to compensate for aurally unprocessed linguistic details and to understand difficult content. Very recently, researchers have found that students' use of deep processing strategies varies according to learner individual difference variables (e.g. Mao and Peng 2023; Tai and Tang 2021). For example, drawing on student questionnaires collected from EMI postgraduate courses in Taiwan, Tai and Tang (2021) revealed that certain deep processing strategy types (e.g. critical thinking) were negatively associated with anxiety. In a focal EMI programme in mainland China, Mao and Peng (2023) also found that students' academic major may influence their use of deep processing strategies. These studies indicate that when researching students' use of deep processing strategies, it is important to take into account individual differences such as their demographic background, motivation, and English proficiency, instead of treating the students as a unitary cohort.

Rethinking the role of proficiency in EMI listening

Listening proficiency has long been a frequently explored variable in L2 listening strategy research. Originating from the notion of the *good language learner* (Rubin 1975), years of research has examined how more proficient or skilled listeners use strategies differently from less proficient learners (e.g. Fung and Macaro 2021; Goh 2002; Goh and Hu 2014; Graham, Santos, and Vanderplank 2010; O'Malley, Chamot, and Kupper 1989; Vandergrift 2003). One general finding is that more proficient listeners tend to employ more top-down strategies (e.g. predicting), drawing on their prior knowledge (i.e. schemata) to predict the speaker's unfolding speech. Less proficient listeners, however, often rely on bottom-up strategies to decode linguistic cues (e.g. mental translation), and aggregate upwards to form larger units of meaning (Goh 2002; O'Malley, Chamot, and Kupper 1989; Vandergrift 2003).

However, as Macaro (2018; 2022) argues, the type of listening required for comprehending EMI academic lectures is very different from listening exercises in an English as a foreign language (EFL) classroom. Mainly, EMI lectures differ from EFL listening tasks in the level of professionalism of topical knowledge, as well as how such knowledge is structured. While EFL listening usually includes topics based on everyday real-world knowledge (e.g. food, travel, and sport), an EMI lecture involves topics more specialised and professional (e.g. 'auditing' in a Finance course). Further, an EFL class usually involves listening to short, pre-recorded materials with a minimal range of fixed topical knowledge structures. However, a lengthy EMI lecture usually presents topical knowledge following certain academic discourse structures (Thompson 2003), such as stating a thesis at the beginning, followed by providing justifications, exemplifications, and concluding remarks (Flowerdew and Miller 1997). Such disparity between the type of listening required in EMI and

EFL classes may require a re-examination of how students' English proficiency may affect listening processes.

In comparison to EFL classroom listening, the more prominent role of topical knowledge in EMI lectures may compel listeners to activate more top-down processes, even for those with limited proficiency. Although research exploring this issue is very limited, some initial evidence has found that students in a secondary EMI biology class, regardless of their English proficiency levels, used more content-mediated strategies than language-mediated strategies (Fung and Lo 2023). For example, they adopted strategies such as *expansion* and *mental participation* to expand on their understanding of disciplinary concepts by adding examples, definitions, and comparisons, as well as to prepare answers to teachers' questions. Moreover, EMI research has found that students often resort to previewing to improve their comprehension of EMI lectures (e.g. Ding and Stapleton 2016; Jiang and Zhang 2019; Zhou and Rose 2021). It is possible that such previewing may help students build their repertoire of relevant schematic knowledge to activate more easily top-down processing of content when listening in class. When such top-down processing is 'married' to bottom-up decoding (Lynch 2006), even listeners with lower proficiency might be able to achieve meaningful, in-depth processing of content knowledge. These studies suggest that due to the distinct features of listening and learning in EMI contexts, English proficiency may play a substantially different role in comprehension compared to that in EFL contexts. Subsequently, more research is required to re-examine the role of English proficiency in EMI lectures.

The role of motivation in deep processing strategy use

Panadero et al. (2021) argue that deep processing strategies allow for associations to be created between new and existing information; these associations facilitate 'the restructuring of existing information', which is crucial for the 'successful acquisition of knowledge' (12). However, since such strategies are usually cognitively demanding, researchers have found that their usage is driven by certain types of motivational beliefs (e.g. Fenollar, Román, and Cuestas 2007; McWhaw and Abrami 2001; Neuville, Frenay, and Bourgeois 2013; Panadero et al. 2021; Phan 2009). One of such beliefs is self-efficacy, referring to individuals' beliefs in their capabilities to achieve domain-specific goals (Bandura 1997). Research exploring students' learning of academic subjects has found high self-efficacy to be associated with increased use of deep processing strategies (Fenollar, Román, and Cuestas 2007; Neuville, Frenay, and Bourgeois 2013; Phan 2009). In L2 listening, students' self-efficacy has been identified as an important factor affecting comprehension (e.g. Graham 2011; Graham and Macaro 2008; Mills, Pajares, and Herron 2006; Yeldham and Gruba 2016), and recent EMI research has even pinpointed self-efficacy as a significant predictor of students' academic performance (e.g. Soruç et al. 2022; Thompson et al. 2022). In EMI lectures, it is possible that students with high self-efficacy may panic less in the face of comprehension breakdowns and handle anxiety better in such circumstances (Graham 2011; Zhou et al. 2023), hence, helping them more effectively process subject content.

Conceptualised within a social cognitive framework of motivation, Pintrich et al. (1991) developed the Motivated Strategies for Learning Questionnaire (MSLQ). The MSLQ includes three value-laden constructs that measure reasons why students engage in an academic task: *intrinsic goal orientation, extrinsic goal orientation,* and *task value*. Intrinsic goal orientation refers to learning motivated by an internal curiosity and mastery. Extrinsic goal orientation, on the other hand, refers to learning aimed at achieving external ends such as getting good grades or praise from others. Task value measures students' perceptions of how important, useful, and interesting the learning task is. Educational research has found that students who value the task are more likely to adopt deep processing strategies (e.g. Neuville, Frenay, and Bourgeois 2013; Pintrich and Schunk 2002). Furthermore, an intrinsic goal oriented at mastery has been found to be positively related to academic performance (e.g. Tanaka and Yamauchi 2001; Vansteenkiste et al. 2004). Students with intrinsic goals were also found to engage in more critical

thinking to improve their understanding of subject content (Phan 2009) and to use more cognitive strategies in general (e.g. Ames and Archer 1988; Pintrich and Schunk 2002; Vermetten, Lodewijks, and Vermunt 2001). Research on extrinsic goal orientation has produced mixed results, with studies reporting positive (e.g. McWhaw and Abrami 2001) or negative correlation (e.g. Wolters, Yu, and Pintrich 1996) with students' strategy use.

To summarise, previous research has raised concerns that students might not be able to process content knowledge in depth during EMI lectures, even though there has been limited empirical evidence. Students' English listening proficiency and motivation have been found to influence strategy use in EFL listening and academic learning respectively, whereas their roles have seldom been examined in EMI settings. This study therefore hopes to understand students' use of deep processing strategies when listening to EMI lectures, and to identify whether English proficiency and motivation contribute to students' reported strategy use. The study aims to answer two research questions:

1. To what extent do students employ strategies for the deep processing of content knowledge while listening to EMI lectures?
2. What are the roles of English listening proficiency and motivational beliefs (i.e. self-efficacy, goal orientation, and task value) in students' use of strategies for the deep processing of content knowledge in EMI lectures?

Methodology

The study adopts a triangulation mixed-methods design, collecting quantitative questionnaire and qualitative interview data concurrently, analysing each dataset independently, then merging them for interpretation and triangulation of the findings.

Research context and participants

We collected all data at an EMI university in southeast China. The university is a comprehensive university jointly run by a Chinese university and its partner university in an Anglophone country. Around 900 academic staff from more than 50 countries teach at the university, through the official teaching language of English. Students are required to participate in the Oxford Online Placement Test (OOPT) upon admission, which is a standardised test validated by Oxford University Press (2020). The test benchmarks students' English proficiency according to the Common European Framework of Reference for Languages (CEFR). After requesting permission from the ethics committee and senior management of the university, we were granted permission to use the test scores of students majoring in *Business* and *Humanities and Social Sciences* from which we drew our sample.

The questionnaire participants were purposively sampled to include 316 first-year students, all of whom graduated from Chinese-medium secondary schools, with Mandarin Chinese as their L1. Their English listening proficiency was well balanced, including 73 students at a basic level of A1 or A2, 138 students at an intermediate level of B1, and 105 students at an upper-intermediate or advanced level of B2 or above. The majority of the students have never studied or lived abroad ($n = 275$), while a small number spent less than one month abroad ($n = 41$). There were 246 female participants and 70 male participants. This imbalance in gender distribution may be due to the fact that our selected subject areas tend to attract more female students. From the questionnaire respondents, we followed a maximum variation sampling strategy to recruit 35 students for semi-structured interviews. The sample is balanced across low, medium, and high proficiency levels (A1 to A2: $n = 9$; B1: $n = 15$; B2 to C2: $n = 11$).

Data collection instruments and procedures

Quantitative data collected for the study include students' OOPT listening scores (total score 120), as a measure of English listening proficiency, and responses to three questionnaires. The questionnaires were adapted from existing scales and checked by four experts in EMI and listening research to improve content validity. The questionnaires were piloted with 122 first-year students to improve the clarity of wording and then validated with factor analysis in previous studies (Zhou and Rose 2021; Zhou and Thompson 2023b).

The 15-item *Deep processing listening strategies questionnaire* was adapted from the MSLQ (Pintrich et al. 1991) and uses a 6-point Likert scale (1 = strongly disagree; 6 = strongly agree). It measures students' use of *elaboration*, *organisation*, and *critical thinking* strategies, which Pintrich (2004) identified as deep-level strategies (see Zhou and Rose [2021] for the items and factor analysis results). *Elaboration* strategies build internal connections between new and prior knowledge. *Organisation* strategies involve structuring and outlining content knowledge. *Critical thinking* strategies refer to the critical evaluation of teachers' speech and developing alternative ideas. Cronbach's α for the whole questionnaire was 0.91, with the three factors at 0.85 (*elaboration*), 0.81 (*organisation*), and 0.86 (*critical thinking*), respectively, indicating a relatively high reliability (as per Dörnyei and Dewaele 2023).

The 14-item *Motivation in learning EMI courses questionnaire*, also adapted from the MSLQ, measures students' *intrinsic goals* (for curiosity and mastery), *extrinsic goals* (for external rewards), and *task value* (perceived importance, utility, and interest in learning subject content through English) to learn in EMI courses (see Zhou and Thompson [2023b] for the items and factor analysis results). The questionnaire demonstrated an acceptable reliability with Cronbach's α at 0.85; all individual factors exceeded 0.70. Since self-efficacy is domain-specific (Bandura 1997), we used an independent *Self-efficacy in listening to EMI lectures questionnaire* to measure students' perceived capability of understanding EMI lectures, on a scale from 0 (cannot understand at all) to 100 (certainly can understand), following Bandura's (2006) advice (see Zhou and Rose 2021 for the items and principal component analysis results). The questionnaire was highly reliable with a Cronbach's α of 0.97.

Finally, the first author conducted semi-structured interviews the week after the questionnaires were distributed. The interviews were conducted in the participants' and interviewer's shared L1 (Mandarin Chinese) to encourage free discussion and elaboration. During the interviews, students were asked about their strategies for understanding EMI lectures, their feelings and motivation to study in EMI courses, and to comment on whether and how they think the two aspects are related. Probes were provided to facilitate further reflection when relevant themes were touched upon. The interviews were audio-recorded and transcribed for data analysis.

Data analysis

Questionnaire data were analysed using SPSS 27.0. Descriptive statistics such as mean and standard deviation (SD) were calculated to answer RQ1, outlining students' use of deep processing strategies. To answer RQ2, a hierarchical multiple regression analysis was conducted, with deep processing strategies as outcome variables and controlling for basic demographic variables (i.e. gender, major, study abroad experience) as covariates. Students' listening proficiency and motivational variables were entered stepwise into the model as predictor variables to delineate changes in the variance in strategy use explained by proficiency and motivation, respectively. Assumptions of linearity, normality of residuals, and homoscedasticity were checked, while confirming that no multicollinearity issues existed prior to the analysis.

Thematic analysis of interview data was conducted with NVivo 11.0 to supplement and triangulate findings for RQ2. Transcripts of individual interviewees (referred to as 'cases') were given an attribute of 'proficiency' in NVivo that distinguished them into high (B2 and above), medium

(B1), and low (A1 to A2) proficiency groups. Then, following Kuckartz's (2014) guidelines, transcripts were read carefully to code relevant passages into two main categories of 'deep processing strategies' and 'motivation'. Within each main category, data were coded inductively to allow sub-categories and themes regarding strategies (e.g. elaboration) and motivational beliefs (e.g. intrinsic goal) to be identified. Then, using the 'matrix coding' function, passages coded under different proficiency levels were retrieved to examine similarities and differences in strategy use. Excerpts coded under both 'strategies' and 'motivation' were also retrieved to investigate the relationship between the two.

Findings

Students' use of deep processing listening strategies

The descriptive statistics show that students in general reported a moderate use of deep processing strategies when listening to EMI lectures, where the mean value for *elaboration*, *critical thinking*, and *organisation* strategies all exceed the middle point 3.5 (see Table 1). Overall, *elaboration* is the most heavily used strategy (*Mean* = 4.42, *SD* = 0.66), where over 80% of students reported to relate their teacher's talk to the students' prior knowledge and use information from pre-reading to make sense of what they heard in class. A moderate level of *critical thinking* was also noted (*Mean* = 4.01, *SD* = 0.75), where more than 70% of students, to varying degrees, considered alternative ideas and developed their own ideas when hearing an assertion or conclusion in class. Notably, however, only 47% of students reported using the strategy 'questioning whether ideas are convincing when presented', indicating that less than half of the students reported challenging the authority of teachers when listening. Students generally used *organisation* strategies (*Mean* = 3.99, *SD* = 0.85) to coordinate ideas heard in EMI lectures, and much of the effort took place *after* class: Around 70% of the students tried to identify important ideas and create lists of key concepts by referring to class notes. However, when students listened *in* class, only around 45% of them reported resorting to visual tools such as charts, diagrams, or tables to organise the information, though the majority (75%) reported taking notes of key points. This suggests that students might be selectively using certain strategies to assist comprehension during EMI lectures and then further deepening their understanding after class with more cognitively demanding strategies.

Table 1. Descriptive statistics of students' use of deep processing listening strategies.

Strategy items	*M*	*SD*	% of use
Elaboration	**4.42**	**0.66**	
Relating what the teacher says to what I already know	4.58	0.81	87.6
Pulling information from other sources (e.g. pre-reading) to help understand	4.53	0.90	81.5
Connecting concepts heard in class with pre-class reading to help understand	4.46	0.84	83.7
Applying ideas heard from teacher to other class activities (e.g. discussion)	4.35	0.89	79.1
Writing brief summaries of main ideas of teacher talk	4.27	0.93	75.4
Relating ideas heard in this lesson to other lessons	4.22	0.92	72.8
Critical thinking	**4.01**	**0.75**	
Thinking about alternatives when hearing an assertion/conclusion in class	4.21	0.87	75.3
Developing ideas on my own based on what I hear from the teacher	4.16	0.90	73.5
Playing around ideas of my own related to what I hear	4.15	0.89	72.5
Questioning supporting evidence when hearing an interpretation/conclusion	3.93	0.94	66.2
Questioning whether ideas are convincing when presented	3.62	1.07	47.0
Organisation	**3.99**	**0.85**	
Identifying important ideas by browsing class notes after class	4.23	1.04	69.8
Outlining key points to organise thoughts while listening	4.16	1.00	75.6
Organising and listing key concepts after class using the class notes	4.11	1.04	68.9
Using charts, diagrams or tables to organise ideas while listening	3.49	1.18	44.8

Note. '% of use' refers to the total percentage of students who have answered 'somewhat agree', 'agree' or 'strongly agree' to the use of strategy item.

Table 2. Hierarchical multiple regression of listening proficiency and motivation on deep processing listening strategy use.

		Model 1					Model 2				
Outcome variable	Predictor variable	*B*	*SE B*	*β*	*Sig.*	Model summary	*B*	*SE B*	*β*	*Sig.*	Model summary
Elaboration	Constant	4.19	0.20		0.000	$R^2 = .026$	1.55	0.31		0.000	$R^2 = .386$
	Gender	−0.05	0.10	−0.03	0.631	$F(4,285) = 1.87$	0.02	0.08	0.01	0.835	$F(8,281) = 22.06$
	Major	−0.08	0.09	−0.05	0.375	$p = .116$	−0.03	0.07	−0.02	0.717	$p = .000$
	Study abroad	0.05	0.12	0.02	0.697		0.07	0.10	0.03	0.513	
	Proficiency	0.01	0.00	0.14	0.017		0.00	0.00	−0.02	0.667	
	Self-efficacy						0.01	0.00	0.18**	0.004	
	Intrinsic goal						0.28	0.05	0.30***	0.000	
	Extrinsic goal						−0.01	0.04	−0.02	0.770	
	Task value						0.28	0.06	0.30***	0.000	
Critical thinking	Constant	4.07	0.24		0.000	$R^2 = .020$	2.17	0.39		0.000	$R^2 = .252$
	Gender	−0.24	0.12	−0.12	0.043	$F(4,285) = 1.44$	−0.16	0.10	−0.08	0.125	$F(8,281) = 11.86$
	Major	−0.04	0.10	−0.02	0.718	$p = .221$	−0.03	0.09	−0.02	0.705	$p = .000$
	Study abroad	0.02	0.14	0.01	0.872		0.04	0.13	0.02	0.772	
	Proficiency	0.00	0.00	0.06	0.335		−0.01	0.00	−0.12	0.042	
	Self-efficacy						0.01	0.00	0.31***	0.000	
	Intrinsic goal						0.32	0.07	0.30***	0.000	
	Extrinsic goal						0.02	0.06	0.02	0.792	
	Task value						0.01	0.08	0.01	0.929	
Organisation	Constant	3.52	0.27		0.000	$R^2 = .015$	1.20	0.45		0.008	$R^2 = .215$
	Gender	0.08	0.13	0.04	0.537	$F(4,285) = 1.08$	0.16	0.12	0.07	0.183	$F(8,281) = 9.63$
	Major	0.16	0.11	0.09	0.155	$p = .366$	0.20	0.10	0.10	0.063	$p = .000$
	Study abroad	0.20	0.16	0.07	0.214		0.21	0.15	0.08	0.150	
	Proficiency	0.00	0.00	0.05	0.418		0.00	0.00	−0.09	0.134	
	Self-efficacy						0.01	0.00	0.19**	0.005	
	Intrinsic goal						0.33	0.08	0.28***	0.000	
	Extrinsic goal						−0.02	0.07	−0.02	0.722	
	Task value						0.15	0.09	0.12	0.099	

Note. $^{**}p < .01$, $^{***}p < .001$.

The role of proficiency and motivation in deep processing strategy use

How proficiency and motivational beliefs predict strategy use

Table 2 presents the results of the hierarchical multiple regression analyses that enter listening proficiency and basic demographic variables (i.e. gender, major, study abroad experience) in Model 1, and then incorporate motivational variables in Model 2. In Model 1, when listening proficiency was the only predictor variable (with basic demographic variables controlled for as covariates), it failed to predict a significant amount of variance in any strategy type, as indicated by the R^2 of the model. However, in Model 2, when motivational variables were incorporated, the model significantly explained 38.6% of variance in *elaboration* ($F(8,281) = 22.06$, $p < .001$), 25.3% of *critical thinking strategies* ($F(8,281) = 11.86$, $p < .001$), and 21.5% of *organisation* ($F(8,281) = 9.63$, $p < .001$). The results highlight students' motivational beliefs as key predictors of deep processing strategy use, surpassing that of listening proficiency.

Among the motivational beliefs, *intrinsic goal orientation* and *self-efficacy* consistently predicted all three types of strategies. Students' intrinsic learning goals appeared to be the strongest predictor, as indicated by a larger β value for predicting the strategy of *elaboration* ($\beta = .30$, $p < .001$), *critical thinking* ($\beta = .30$, $p < .001$), and *organisation* ($\beta = .28$, $p < .001$). Extrinsic goal orientations, however, failed to significantly predict any strategy use. This indicates that when students are curious about the subject content, instead of seeking external rewards, they tend to employ strategies to process knowledge in depth and engage in more meaningful learning. In addition to intrinsic learning goals, self-efficacy was another significant predictor of all strategy types, though with a moderate effect for *critical thinking* ($\beta = .31$, $p < .001$) and smaller effect for *elaboration* ($\beta = .18$, $p = .004$) and *organisation* ($\beta = .19$, $p = .005$). This suggests that when students are confident about their ability to understand EMI lectures, they may more critically evaluate the ideas that are presented by their teachers, and try to connect and organise knolwedge points to form a coherent cognitive map of subject content .

A closer look at the role of English listening proficiency and motivation

Findings from the interview data largely support the statistical results to reveal that motivational beliefs seemed to impact more heavily on students' deep processing of content than their English listening proficiency. However, although low-proficiency students resembled their highly proficient peers in some aspects of deep processing strategy use, they differed substantially in how they previewed before class to enable such strategy use in class. We present the representative excerpts below with students' pseudonyms and their English listening proficiency (e.g. Yu, A1).

The role of English listening proficiency. Findings from the interview data reveal that when low-proficiency students reported using deep processing strategies, they seemed to rely heavily on previewing before classs as a requisite for such strategy use. Compared with their more proficient peers, these students tended to engage in more detail-oriented and effortful previewing. For example, Yu (A1) described her previewing process as follows:

> I like to prioritise textbooks or pre-reading materials first, and then PowerPoint slides. Because the textbooks are more comprehensive and contain more details, if I read them first and then the slides, I can better grasp key content. … When I read slides, I read them line by line, very carefully, and sometimes I'll take note of my own understanding next to the key points. I also study the structure [of reading materials], repeatedly reading the subheadings and the main idea below each subheading.

Similarly, other low-proficiency listeners also reported 'trying to understand the meaning of every sentence' when previewing (Zhi, A2) and 'reading the textbook several times to understand more' (Xin, A2). This detail-oriented process of previewing seemed to enrich the topical schemata of the students, catalysing strategic processes such as meaning inferencing when comprehension problems occur in class: 'If I've read about this company case before class, I can guess what the teacher means, even if I don't know some expressions, and develop my own thread of analysis' (Luo, A2). By

relating to what they previewed, these students seemed more capable of anticipating teacher's talk as well as connecting and structuring knowledge, as noted by Yu (A1):

> After I've previewed, I feel it's easier to follow the teacher's pace. I can relate to the knowledge structure of the preview, have a more concrete direction, predict what the teacher is going to say, and notice the links between knowledge.

In contrast, higher-proficiency students were inclined to simplify their previewing processes, focusing only on the general knowledge structures, as reflected in Hao's (B2) comment:

> When I preview, I go over the materials and circle the words I don't know. I'll check the slides and glance over the titles and subtitles so that I'll know the general structure. I often don't read the examples and details because the teacher will cover these in class anyway.

For these students, previewing was perceived conducive to deep processing in lectures but not indispensable: 'If I don't preview, surely it will affect some of my understanding. But if I concentrate and listen well in class, the effect might be minimal' (Kei, C1). As such, it seems that low-proficiency students relied on laborious previewing to build up their topical and structural schemata for more meaningful processing in class; however, such processes seemed optional, if not unnecessary, for their highly proficient peers.

The role of motivational beliefs. Another theme we identified in the interview data was that students' learning effort in (and outside of) EMI classes appeared to be primarily driven by their motivation to learn content knowledge. When the topics of EMI lectures were perceived as having high practical value and relating to their daily life, students may become more curious and develop an intrinsically driven goal, which could in turn make them concentrate more deeply while listening. This was reflected in Han's (B1) account:

> If a topic is close to my life, and I know about it, I would feel more interested. For example, many of us like to drink Starbucks. If the teacher can use this as 'bait' to teach us, then surely it will stimulate our interest, and we would listen carefully to know the values and business operations behind this brand. I might also look for additional materials about it to read after class.

As can be seen from Han's comment, the relevance and usefulness of subject-content knowledge seemed to cultivate an intrinsic learning goal, which not only made him more focused in class but also promoted further learning beyond the classroom. When learning is driven by an internal desire to master academic knowledge instead of just seeking external rewards, students might also actively monitor how well they comprehend and reflect on ways to understand in more depth. For example, Dou (C2), who scored highly on the intrinsic goal orientation scale, described how he monitored and reflected on comprehension during EMI lectures:

> In university lecture classrooms, you can choose to sit in the front row or in the last row – it's totally up to you what type of learning you'd like to achieve. For me, this course is important, and I'm interested in the content itself so I always try to find a nice spot in the first row, where I can see the teacher and answer questions. I always try to answer every question. But sometimes when I hesitate or even can't answer certain questions, I ask myself: Why can't I answer it? Why is there only a vague concept?

For Dou, the desire to 'always sit in the front row' indicates a strong intrinsic learning goal that is oriented at mastering content knowledge. Having this goal in mind activated a series of questions he asked himself when his monitoring identified problems in understanding. These problems then served as a source of self-reflection, offering diagnostic information about the effectiveness of lecture comprehension. Potentially, such reflection can further turn into opportunities for adaptations in shaping his future learning behaviour.

In addition, students' self-efficacy in their listening ability, as emerged from the interview data, seemed to particularly affect certain deep processing strategy use such as critical thinking. Inadequate self-efficacy appeared to result in a sense of self-doubt, impeding attempts such as

the critical evaluation of the teacher's talk in class. Tian (A2), for example, described such a moment:

> Sometimes, I might have a bit of my own understanding, and it might be different from what the teacher has talked about. But I tend to doubt myself a lot, and I always worry if I've understood the teacher correctly. After all, listening is my weakest English skill. So, still, I kind of respect what the teacher says as the authority, because I'd feel that I might have understood it wrongly due to my poor English.

As can be seen from the excerpt, although Tian (A2) recognised differences between her own understanding with that of the teacher, she quickly attributed it to a possibility that she 'understood it wrongly'. In contrast, highly efficacious students tended to seek confirmation and explanations for differences in understanding, even though their proficiency might be low: 'When my understanding differs from what the teacher has talked about, I'd ask her after class, tell her how I thought, and then she might tell me what the problems are with my understanding' (Yuan, A2). It thus appears that highly efficacious students might be more likely to engage in a thorough understanding of the issue by comparing and evaluating alternatives perspectives, instead of immediately negating their own thoughts due to their perceived inability to understand as low-efficacy students did.

Discussion

This study investigated the deep processing strategies used by students when listening to EMI lectures at the university level. Several major findings are noteworthy. First, students reported using a range of deep processing listening strategies when they listened to lectures, including *elaboration* (e.g. relating what the teacher says to what I already know), *critical thinking* (e.g. thinking about alternatives when hearing an assertion/conclusion in class), and *organisation* (e.g. identifying important ideas by browsing class notes after/outside of class). However, among these strategies, two strategies were used by less than half of the students, and they are: 'questioning whether ideas are convincing when presented', and 'using charts, diagrams or tables to organize ideas while listening'. The comparatively lower use of the former strategy might be due to strong cultural influences on Chinese students, who have been documented as regarding listening to the teacher, and not questioning, as respecting the teacher (An and Thomas 2021). As a result, they may be viewed, unnecessarily, as being less disposed to critical thinking (e.g. McBride et al. 2002). For the less common use of charts and diagrams to organise ideas while listening, one possible reason could be that students may not have been aware of or received strategy training on how to use charts, diagrams, or tables to organise their ideas while listening. This echoes Goh and Hu (2014), who also point out that certain strategies under used by Chinese ESL listeners were due to their lack of awareness of these strategies rather than an unwillingness to use the strategies. In other words, if we expect students to use certain strategies, we have an obligation to assess their awareness of those strategies, and, if necessary, provide systematic instruction and support (see Reinders et al. 2023).

A second major finding of our study is that English listening proficiency failed to significantly predict students' use of deep processing strategies in EMI lectures. This finding posits differently from studies that found English proficiency a significant predictor of EMI academic success (e.g. Rose et al. 2020; Thompson et al. 2022) and indicates that low proficiency might not necessarily always result in shallow processing of content. Interview findings in our study show that when students were limited in their proficiency, they managed to compensate for their lack of understanding by engaging in thorough previewing, carefully studying pre-reading materials and developing elaborate knowledge structures. Lynch (2006) suggests that listeners may draw on both *content* and *formal* schemata to understand an academic lecture. *Content* schemata refer to networks of topical knowledge while *formal* schemata represent the structure of knowledge. Therefore, it might be possible that such previewing enriched students' content schemata by adding knowledge details and built their formal schemata for anchoring knowledge points when listening to EMI teachers (see Zhou and Rose 2021).

Finally, our study highlights that students' intrinsic learning goals and self-efficacy might play a more important role than listening proficiency in driving their processing of content knowledge in EMI courses. Such findings align with previous educational research, which has found that intrinsic goals oriented at mastery and curiosity are positively related to academic performance (e.g. Tanaka and Yamauchi 2001; Vansteenkiste et al. 2004) and cognitive strategy use (e.g. Phan 2009; Pintrich and Schunk 2002; Vermetten, Lodewijks, and Vermunt 2001; Wolters, Yu, and Pintrich 1996). In EMI research, it has been found that language-related motivation such as the ideal L2 self failed to predict academic performance (Rose et al. 2020; Xie and Curle 2022). Our finding builds upon this, and suggests that learning effort and, possibly, learning success, might be more closely associated with content-related beliefs rather than language-related beliefs in EMI educational contexts. Students' self-efficacy was also found to predict a variety of deep processing strategies, particularly *critical thinking*. Graham (2011) points out that in academic English listening tasks, self-efficacy is particularly important in helping learners to reduce anxiety and handle the authentic, live, and ephemeral input. In EMI research, self-efficacy has also been identified as a significant predictor of students' academic performance (e.g. Soruç et al. 2022; Thompson et al. 2022), and such efficacy beliefs may change as students progress into EMI courses (Zhou et al. 2023). Our finding extends understanding in this line of research and shows that when students are confident in their listening, they might be more inclined to carry out higher-order thinking, critically compare their understanding of content with the teacher's input, and seek explanations for disparities rather than negating their own understanding. Such meaningful engagement with the content may enhance their academic study, which can potentially explain why self-efficacy was found to be a significant predictor of EMI success.

Conclusion and pedagogical implication

The study addresses a central issue in EMI research by exploring whether students report using deep-level strategies for processing content knowledge when listening to EMI lectures. Our study reveals that students reported using a variety of such strategies to varying degrees, and their strategy use was associated more closely with their self-efficacy and intrinsic learning goals than their English listening proficiency.

Our study points to the importance of fostering students' self-efficacy beliefs in listening and nurturing an internal curiosity for content learning in EMI programmes. Previous studies have suggested that enactive mastery experience, that is, students building up their self-efficacy through previous successful learning experiences, can help students achieve better learning results in EMI (Thompson et al. 2022). EMI courses could consider structuring topics according to a progression of difficulty levels, starting with introductory topics early in the course to help students build their confidence to understand, and then incorporate more intellectually challenging content in later sessions. Put simply, a sink or swim approach to listening in EMI lectures is likely detrimental, both immediately and long term.

Furthermore, EMI lecturers can consider embedding examples relevant to students' personal experience to raise their perceived value and curiosity about the course so as to drive their deep processing strategy use. Systematic instruction to raise awareness of and develop competency in using deep processing strategies is also likely to be beneficial (Reinders et al. 2023). Finally, our study suggests that providing high-quality pre-reading materials prior to EMI lessons may be especially important for low-proficiency listeners (Flowerdew and Miller 2005; Zhou and Thompson 2023a). Such materials might serve as 'advance organisers' (Herron et al. 1998; Jones and Plass 2002), which may help students develop relevant content and structural schemata so that they can activate deep processing strategies to comprehend, organise, and retain information better when listening to EMI lectures.

Several limitations of the study should be noted, forming the basis for our suggestions regarding future research. In this study, we adopted questionnaires and retrospective interviews to explore

students' listening strategy use at a relatively broad level. Such methods are useful for gaining general insights into strategic behaviour; however, more in-depth methods are available and should be considered in future studies (Cohen et al. 2023). For example, we encourage researchers to explore video-recording EMI lectures, if possible, and then use stimulated recall interviews to examine more contextualised, task-specific strategy use. Furthermore, case-based methods such as Process Tracing could help to extend analyses beyond common themes and incorporate a mechanistic, temporal dimension to trace strategic behaviour over time (e.g. from the start of a task to completion, throughout a lecture, during a term, and so on, see Hiver and Al-Hoorie 2020; Thomas et al. forthcoming). Further still, our study sampled from disciplines related to business, social sciences and humanities, which may involve more conceptual explanations than STEM subjects that depend more on mathematical formulaic expressions or graphical illustrations. Since students' strategy use might be contingent on discipline-specific discourse features and pedagogical moves (Dafouz, Hüttner, and Smit 2018; Fung and Chung 2023; Hu and Liu 2018), future research can sample from different subject areas to compare and unpack the complexities of students' strategy use across academic disciplines.

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ORCID

Sihan Zhou http://orcid.org/0000-0002-1815-5938
Daniel Fung http://orcid.org/0000-0001-7005-5697
Nathan Thomas http://orcid.org/0000-0002-3245-8572

References

Airey, J., and C. Linder. 2006. "Language and the Experience of Learning University Physics in Sweden." *European Journal of Physics* 27 (3): 553–560. https://doi.org/10.1088/0143-0807/27/3/009.

Aizawa, I. 2023. "A Comparative Study of Japanese and English Medium Instruction: The Driving Factors Behind Academic Success." *Journal of Multilingual and Multicultural Development*, 1–13. https://doi.org/10.1080/01434632.2023.2184476.

Aizawa, I., and H. Rose. 2020. "High School to University Transitional Challenges in English Medium Instruction in Japan." *System* 95:102390. https://doi.org/10.1016/j.system.2020.102390.

Ames, C., and J. Archer. 1988. "Achievement Goals in the Classroom: Students' Learning Strategies and Motivation Processes." *Journal of Educational Psychology* 80 (3): 260–267. https://doi.org/10.1037/0022-0663.80.3.260.

An, J., and N. Thomas. 2021. Students' Beliefs about the Role of Interaction for Science Learning and Language Learning in EMI Science Classes: Evidence from High Schools in China. *Linguistics and Education* 65:100972. https://doi.org/10.1016/j.linged.2021.100972.

Arco-Tirado, J., F. Fernández-Martín, A. Ramos-García, L. Littvay, J. Villoria, and J. Naranjo. 2018. "A Counterfactual Impact Evaluation of a Bilingual Program on Students' Grade Point Average at a Spanish University." *Evaluation and Program Planning* 68:81–89. https://doi.org/10.1016/j.evalprogplan.2018.02.013.

Bandura, A. 1997. *Self-Efficacy: The Exercise of Control.* New York: Freeman.

Bandura, A. 2006. *Self-Efficacy Beliefs of Adolescents*. Information Age Publishing.

Cohen, A. D., P. Y. Gu, M. Nyikos, L. Plonsky, V. Harris, P. Gunning, I. K. Wang, et al. 2023. "Tangible Insights on the Strategizing of Language Learners and Users." *Language Teaching* 56 (3): 313–332. https://doi.org/10.1017/S0261444823000046.

Dafouz, E., M. Camacho, and E. Urquia. 2014. "'Surely They Can't Do as Well': A Comparison of Business Students' Academic Performance in English-Medium and Spanish-as-First-Language-Medium Programmes." *Language and Education* 28 (3): 223–236. https://doi.org/10.1080/09500782.2013.808661.

Dafouz, E., and D. García. 2013. "'Does Everybody Understand?' Teacher Questions Across Disciplines in English-Mediated University Lectures: An Exploratory Study." *Language Value* 5 (1): 129–151. https://doi.org/10.6035/LanguageV.2013.5.7.

Dafouz, E., J. Hüttner, and U. Smit. 2018. "New Contexts, New Challenges for TESOL: Understanding Disciplinary Reasoning in Oral Interactions in English-Medium Instruction." *TESOL Quarterly* 52 (3): 540–563. https://doi.org/10.1002/tesq.459.

Ding, F., and P. Stapleton. 2016. "Walking Like a Toddler: Students' Autonomy Development in English During Cross-Border Transitions." *System* 59:12–28. https://doi.org/10.1016/j.system.2016.04.003.

Dinsmore. 2018. *Strategic Processing in Education*. New York: Routledge.

Dörnyei, Z., and J. Dewaele. 2023. *Questionnaires in Second Language Research: Construction, Administration, and Processing*. 3rd ed. New York: Routledge.

Fenollar, P., S. Román, and P. J. Cuestas. 2007. "University Students' Academic Performance: An Integrative Conceptual Framework and Empirical Analysis." *British Journal of Educational Psychology* 77 (4): 873–891. https://doi.org/10.1348/000709907X189118.

Flowerdew, J., and L. Miller. 1997. "The Teaching of Academic Listening Comprehension and the Question of Authenticity." *English for Specific Purposes* 16 (1): 27–46. https://doi.org/10.1016/S0889-4906(96)00030-0.

Flowerdew, J., and L. Miller. 2005. *Second Language Listening: Theory and Practice*. New York: Cambridge University Press.

Fung, D., and E. Chung. 2023. "Defining Language Goals in EMI: Vocabulary Demand in a High-Stakes Assessment in Hong Kong." *Language and Education*: 1–15. http://doi.org/10.1080/09500782.2023.2219654.

Fung, D., and Y. Y. Lo. 2023. "Listening Strategies in the English Medium Instruction (EMI) Classroom: How Students Comprehend the Teacher Input." *System* 113:103004. https://doi.org/10.1016/j.system.2023.103004.

Fung, D., and E. Macaro. 2021. "Exploring the Relationship Between Linguistic Knowledge and Strategy Use in Listening Comprehension." *Language Teaching Research* 25 (4): 540–564. https://doi.org/10.1177/1362168819868879.

Galloway, N., J. Kriukow, and T. Numajiri. 2017. *Internationalisation, Higher Education and the Growing Demand for English: An Investigation Into the English Medium of Instruction (EMI) Movement in China and Japan*. London: The British Council.

Goh, C. 2002. "Exploring Listening Comprehension Tactics and Their Interaction Patterns." *System* 30 (2): 185–206. https://doi.org/10.1016/S0346-251X(02)00004-0.

Goh, C. C., and G. Hu. 2014. "Exploring the Relationship between Metacognitive Awareness and Listening Performance with Questionnaire Data." *Language Awareness* 23 (3): 255–274. https://doi.org/10.1080/09658416.2013.769558.

Graham, S. 2011. "Self-Efficacy and Academic Listening." *Journal of English for Academic Purposes* 10 (2): 113–117. https://doi.org/10.1016/j.jeap.2011.04.001.

Graham, S., and E. Macaro. 2008. "Strategy Instruction in Listening for Lower-Intermediate Learners of French." *Language Learning* 58 (4): 747–783. https://doi.org/10.1111/j.1467-9922.2008.00478.x.

Graham, S., D. Santos, and R. Vanderplank. 2010. "Strategy Clusters and Sources of Knowledge in French L2 Listening Comprehension." *Innovation in Language Learning and Teaching* 4 (1): 1–20. https://doi.org/10.1080/17501220802385866.

Hellekjær, G. O. 2010. Lecture Comprehension in English-Medium Higher Education. *Hermes* 45:11–34.

Herron, C., H. York, S. P. Cole, and P. Linden. 1998. "A Comparison Study of Student Retention of Foreign Language Video: Declarative Versus Interrogative Advance Organizer." *The Modern Language Journal* 82 (2): 237–247. https://doi.org/10.1111/j.1540-4781.1998.tb01197.x.

Hiver, P., and A. H. Al-Hoorie. 2020. *Research Methods for Complexity Theory in Applied Linguistics*. Blue Ridge Summit, PA: Multilingual Matters.

Hu, G., and Y. Duan. 2019. "Questioning and Responding in the Classroom: A Cross-Disciplinary Study of the Effects of Instructional Mediums in Academic Subjects at a Chinese University." *International Journal of Bilingual Education and Bilingualism* 22 (3): 303–321. https://doi.org/10.1080/13670050.2018.1493084.

Hu, G., and Y. Liu. 2018. "Three Minute Thesis Presentations as an Academic Genre: A Cross-Disciplinary Study of Genre Moves." *Journal of English for Academic Purposes* 35:16–30. https://doi.org/10.1016/j.jeap.2018.06.004.

Jiang, A. L., and L. J. Zhang. 2019. "Chinese Students' Perceptions of English Learning Affordances and Their Agency in an English-Medium Instruction Classroom Context." *Language and Education* 33 (4): 322–339. https://doi.org/10.1080/09500782.2019.1578789.

Joe, Y., and H. Lee. 2013. "Does English-Medium Instruction Benefit Students in EFL Contexts? A Case Study of Medical Students in Korea." *The Asia-Pacific Education Researcher* 22 (2): 201–207. https://doi.org/10.1007/s40299-012-0003-7.

Jones, L. C., and J. L. Plass. 2002. "Supporting Listening Comprehension and Vocabulary Acquisition in French with Multimedia Annotations." *The Modern Language Journal* 86 (4): 546–561. https://doi.org/10.1111/1540-4781.00160.

Kim, E. G., and J. Yoon. 2018. "Korean Science and Engineering Students' Perceptions of English-Medium Instruction and Korean-Medium Instruction." *Journal of Language, Identity & Education* 17 (3): 182–197. https://doi.org/10.1080/15348458.2018.1433539.

Kırkgöz, Y. 2005. "Motivation and Student Perception of Studying in an English-Medium University." *Journal of Language and Linguistic Studies* 1 (1): 101–123.

Kuckartz, U. 2014. *Qualitative Text Analysis: A Guide to Methods, Practice & Using Software*. London: SAGE Publications Ltd.

Li, M. 2018. "The Effectiveness of a Bilingual Education Program at a Chinese University: A Case Study of Social Science Majors." *International Journal of Bilingual Education and Bilingualism* 21 (8): 897–912. https://doi.org/10.1080/13670050.2016.1231164.

Lynch, T. 2006. "Academic Listening: Marrying Top and Bottom." In *Current Trends in Learning and Teaching the Four Skills Within a Communicative Framework*, edited by E. Usó-Juan and A. Martinez-Flor, 91–110. Amsterdam: Mouton.

Macaro, E. 2018. *English Medium Instruction: Content and Language in Policy and Practice*. Oxford: Oxford University Press.

Macaro, E. 2022. "English Medium Instruction: What Do We Know so Far and What Do We Still Need to Find Out?" *Language Teaching* 55 (4): 533–546. https://doi.org/10.1017/S0261444822000052.

Macaro, E., J. Baffoe-djan, H. Rose, B. Sabato, B. Hughes, and D. Cuccurullo. 2019. *Transition from Secondary School CLIL to EMI at University: Initial Evidence from Research in Italy*. London: British Council.

Macaro, E., S. Curle, J. Pun, J. An, and J. Dearden. 2018. "A Systematic Review of English Medium Instruction in Higher Education." *Language Teaching* 51 (1): 36–76. https://doi.org/10.1017/S0261444817000350.

Mao, Y., and J. Peng. 2023. "Exploring Chinese University Students' Learning Strategy Use in English-Medium Instruction Courses." *The Asia-Pacific Education Researcher*. https://doi.org/10.1007/s40299-023-00720-6.

Marton, F., and R. Säljö. 1976. "On Qualitative Differences in Learning: I-Outcome and Process*." *British Journal of Educational Psychology* 46 (1): 4–11. https://doi.org/10.1111/j.2044-8279.1976.tb02980.x.

McBride, R. E., P. Xiang, D. Wittenburg, and J. Shen. 2002. "An Analysis of Preservice Teachers' Dispositions Toward Critical Thinking: A Cross-Cultural Perspective." *Asia-Pacific Journal of Teacher Education* 30 (2): 131–140. https://doi.org/10.1080/13598660220135649.

McWhaw, K., and P. C. Abrami. 2001. "Student Goal Orientation and Interest: Effects on Students' Use of Self-Regulated Learning Strategies." *Contemporary Educational Psychology* 26 (3): 311–329. https://doi.org/10.1006/ceps.2000.1054.

Mills, N., F. Pajares, and C. Herron. 2006. "A Reevaluation of the Role of Anxiety: Self-Efficacy, Anxiety, and Their Relation to Reading and Listening Proficiency." *Foreign Language Annals* 39 (2): 276–295. https://doi.org/10.1111/j.1944-9720.2006.tb02266.x.

Neuville, S., M. Frenay, and E. Bourgeois. 2013. "Task Value, Self-Efficacy and Goal Orientations: Impact on Self-Regulated Learning, Choice and Performance among University Students." *Psychologica Belgica* 47 (1): 95. https://doi.org/10.5334/pb-47-1-95.

O'Malley, J. M., A. U. Chamot, and L. Kupper. 1989. "Listening Comprehension Strategies in Second Language Acquisition." *Applied Linguistics* 10 (4): 418–437. https://doi.org/10.1093/applin/10.4.418.

Oxford University Press. 2020. "Oxford Placement Test: Results You Can Trust." https://elt.oup.com/feature/global/oxford-online-placement/results?cc=gb&selLanguage=en.

Panadero, E., J. Alonso-Tapia, D. García-Pérez, J. Fraile, J. M. Sánchez Galán, and R. Pardo. 2021. "Deep Learning Self-Regulation Strategies: Validation of a Situational Model and its Questionnaire." *Revista de Psicodidáctica (English ed.)* 26 (1): 10–19.

Phan, H. P. 2009. "Relations between Goals, Self-Efficacy, Critical Thinking and Deep Processing Strategies: A Path Analysis." *Educational Psychology* 29 (7): 777–799. https://doi.org/10.1080/01443410903289423.

Pintrich, P. R. 2004. "A Conceptual Framework for Assessing Motivation and Self-Regulated Learning in College Students." *Educational Psychology Review* 16 (4): 385–407. https://doi.org/10.1007/s10648-004-0006-x.

Pintrich, P. R., and D. H. Schunk. 2002. *Motivation in Education: Theory, Research and Applications*. 2nd ed. Upper Saddle River, NJ: Merrill Prentice Hall.

Pintrich, P., D. Smith, T. Garcia, and W. McKeachie. 1991. *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. The University of Michigan. https://files.eric.ed.gov/fulltext/ED338122.pdf.

Reinders, H., L. Phung, S. Ryan, and N. Thomas. 2023. *The Key to Self-Regulated Learning: A Systematic Approach to Maximising its Potential*. Oxford: Oxford University Press.

Rose, H., S. Curle, I. Aizawa, and G. Thompson. 2020. "What Drives Success in English Medium Taught Courses? The Interplay between Language Proficiency, Academic Skills, and Motivation." *Studies in Higher Education* 45 (11): 2149–2161. https://doi.org/10.1080/03075079.2019.1590690.

Rubin, J. 1975. "What the "Good Language Learner" Can Teach Us." *TESOL Quarterly* 9 (1): 41. https://doi.org/10.2307/3586011.

Sahan, K., A. Mikolajewska, H. Rose, E. Macaro, M. Searle, I. Aizawa, S. Zhou, and A. Veitch. 2021. *Global Mapping of English as a Medium of Instruction in Higher Education: 2020 and Beyond*. London: British Council.

Simons, J., S. Dewitte, and W. Lens. 2004. "The Role of Different Types of Instrumentality in Motivation, Study Strategies, and Performance: Know Why You Learn, So You'll Know What You Learn!" *British Journal of Educational Psychology* 74 (3): 343–360. https://doi.org/10.1348/0007099041552314.

Soruç, A., and C. Griffiths. 2018. "English as a Medium of Instruction: Students' Strategies." *ELT Journal* 72 (1): 38–48. https://doi.org/10.1093/elt/ccx017.

Soruç, A., M. Pawlak, D. Yuksel, and B. Horzum. 2022. "Investigating the Impact of Linguistic and Non-Linguistic Factors on EMI Academic Success." *System* 107:102794. https://doi.org/10.1016/j.system.2022.102794.

Sweller, J., P. L. Ayres, and S. Kalyuga. 2011. *Cognitive Load Theory*. New York: Springer.

Tai, T., and C. W. Tang. 2021. "The Role of Graduate Students' Learning Strategies in Reducing Their English Medium Instruction Avoidance: The Mediation Effect of Language Anxiety." *Asia Pacific Journal of Education* 41 (2): 368–384. https://doi.org/10.1080/02188791.2020.1777937.

Tanaka, A., and H. Yamauchi. 2001. "A Model for Achievement Motives, Goal Orientations, Intrinsic Interest, and Academic Achievement." *Psychological Reports* 88 (1): 123–135. https://doi.org/10.2466/pr0.2001.88.1.123.

Teng, L., and J. Lei. 2021. "English-Medium Instruction and Content Learning in Higher Education: Effects of Medium of Instruction, English Proficiency, and Academic Ability." *SAGE Open* 11 (4): 1–10. https://doi.org/10.1177/21582440211061533.

Thomas, N., A. K. Hultgren, B. Zuaro, D. Yuksel, P. Wingrove, M. Nao, and D. Beach. Forthcoming. *Process Tracing for Applied Linguistics*.

Thompson, S. 2003. "Text-structuring Metadiscourse, Intonation and the Signalling of Organisation in Academic Lectures." *Journal of English for Academic Purposes* 2 (1): 5–20. http://doi.org/10.1016/S1475-1585(02)00036-X.

Thompson, G., I. Aizawa, S. Curle, and H. Rose. 2022. "Exploring the Role of Self-Efficacy Beliefs and Learner Success in English Medium Instruction." *International Journal of Bilingual Education and Bilingualism* 25 (1): 196–209. https://doi.org/10.1080/13670050.2019.1651819.

Vandergrift, L. 2003. "Orchestrating Strategy Use: Toward a Model of the Skilled Second Language Listener." *Language Learning* 53 (3): 463–496. https://doi.org/10.1111/1467-9922.00232.

Vansteenkiste, M., J. Simons, W. Lens, B. Soenens, L. Matos, and M. Lacante. 2004. "Less is Sometimes More: Goal Content Matters." *Journal of Educational Psychology* 96 (4): 755–764. https://doi.org/10.1037/0022-0663.96.4.755.

Vermetten, Y. J., H. G. Lodewijks, and J. D. Vermunt. 2001. "The Role of Personality Traits and Goal Orientations in Strategy use." *Contemporary Educational Psychology* 26 (2): 149–170. https://doi.org/10.1006/ceps.1999.1042.

Wächter, B., and F. Maiworm. 2008. *English-Taught Programmes in European Higher Education: The Picture in 2007*. Bonn: Lemmens Medien.

Wächter, B., and F. Maiworm. 2014. *English-Taught Programmes in European Higher Education: The State of Play in 2014.* Bonn: Lemmens.

Wolters, C. A., S. L. Yu, and P. R. Pintrich. 1996. "The Relation between Goal Orientation and Students' Motivational Beliefs and Self-Regulated Learning." *Learning and Individual Differences* 8 (3): 211–238. https://doi.org/10.1016/S1041-6080(96)90015-1.

Xie, W., and S. Curle. 2022. "Success in English Medium Instruction in China: Significant Indicators and Implications." *International Journal of Bilingual Education and Bilingualism* 25 (2): 585–597. https://doi.org/10.1080/13670050.2019.1703898.

Yeldham, M., and P. Gruba. 2016. "The Development of Individual Learners in an L2 Listening Strategies Course." *Language Teaching Research* 20 (1): 9–34. https://doi.org/10.1177/1362168814541723.

Yuan, R., X. Qiu, C. Wang, and T. Zhang. 2022. "Students' Attitudes Toward Language Learning and Use in English-Medium Instruction (EMI) Environments: A Mixed Methods Study." *Journal of Multilingual and Multicultural Development*, 1–16. https://doi.org/10.1080/01434632.2022.2061268.

Zhou, S., J. McKinley, H. Rose, and X. Xu. 2022. "English Medium Higher Education in China: Challenges and ELT Support." *ELT Journal* 76 (2): 261–271. http://doi.org/10.1093/elt/ccab082.

Zhou, S., and H. Rose. 2021. "Self-Regulated Listening of Students at Transition from High School to an English Medium Instruction (EMI) Transnational University in China." *System* 103:102644. https://doi.org/10.1016/j.system.2021.102644.

Zhou, S., and G. Thompson. 2023a. "A Longitudinal Study on Students' Self-regulated Listening During Transition to an English-medium Transnational University in China." *Studies in Second Language Learning and Teaching* 13 (2): 427–450. http://doi.org/10.14746/ssllt.38281.

Zhou, S., and G. Thompson. 2023b. "Exploring the Role of English Proficiency, Self-Efficacy, and Motivation in Listening for Learners Transitioning to an English-Medium Transnational University in China." *System* 113:102998. https://doi.org/10.1016/j.system.2023.102998.

Zhou, S., G. Thompson, and S. Zhou. 2023. "Transitioning from Secondary School to an English-medium Transnational University in China: a Longitudinal Study of Student Self-efficacy and Motivational Beliefs." *International Journal of Bilingual Education and Bilingualism*: 1–14. http://doi.org/10.1080/13670050.2023.2213376.