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Paraphrasing of Hedged Statements by Thai and Non-Thai EFL Medical Science Graduate Students

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Article information	
Abstract	Studies examining how EFL learners paraphrase hedges in scientific statements are still rare even though how learners use hedges in academic writing has been extensively investigated. This study compared paraphrasing strategies that Thai (TH) and non-Thai (NTH) EFL medical science graduate students used to paraphrase given hedges appearing in hedged scientific statements and the types of hedges occurring in their paraphrased versions after a lesson on paraphrasing and lessons on both paraphrasing and hedging. The results from pretests and posttests administered after the initial paraphrasing lesson and after two lessons combining paraphrasing and hedging, respectively, showed that both TH and NTH groups increased their use of lexical, and to a lesser degree strategic and structural hedges, after two lessons. This could be seen from the higher number of hedges in the TH ($\bar{x}$ = 19.1) and NTH ($\bar{x}$ = 19.6) posttests when compared with the TH ($\bar{x}$ = 15.9) and NTH ($\bar{x}$ = 14.2) pretests. This combination of lessons, thus, seemed to help raise the students' awareness of keeping the hedged sense of the original version. The findings of this research suggest that the paraphrasing of hedging in academic writing and possibly other aspects of pragmatic competence can be explicitly taught with a minimal number of lessons.
Keywords	hedging, paraphrasing, academic writing, medical science, EFL graduate students
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1. Introduction

Writing research reports in English can be considered a demanding academic writing task for EFL graduate students who can also be considered novice research report writers. For example, to avoid plagiarism, they need to be able to appropriately cite and paraphrase ideas stated by other scholars, particularly their hedged statements. Hedges are linguistic devices that can help make an utterance less certain (Horn, 2001; Hyland, 1995, 1998). As approval from research community is essential (Hyland, 2006), hedges are widely and acceptably used among scientists (Crismore & Farnsworth, 1990; Hyland, 1998) to appropriately tone down (Hyland, 1996b; Khamkhien, 2014) or moderate the degree of confidence or commitment in presenting scientific claims, arguments, (Hyland, 1998), and interpretation of results (Hyland, 2005; Petchkij, 2016). They can also be used to convince readers to agree with the authors' claims (Crismore & Farnsworth, 1990) and to show modesty to other scholars in their research community (Markkanen & Schroder, 1997; Vazquez & Giner, 2008).

Hedges are mostly found in the discussion sections of academic reports (Hyland, 1998; Martin-Martin, 2008; Yang, 2013), and to a lesser degree in introduction sections, (Martin-Martin, 2008), and abstracts (Gillaerts & Van de Velde, 2010). In medical research reports and case reports, hedges are found most often in discussion and comment sections (Salager-Meyer, 2019). When EFL medical science graduate students cite hedged statements, they, therefore, need to be able to paraphrase and keep the hedged sense of the original version. If they drop hedges, their paraphrased version can possibly be read as facts (Hyland, 1998), and this could affect how other scholars in the field would understand the claims or conclusions previously made in the original article (Horn, 2001). Moreover, as the status of a scientific conclusion, claim, or argument can change over time, such as from an argument to a fact (Latour & Woolgar, 1986), paraphrasing of hedged statements requires both paraphrasing skills and updated scientific knowledge of the field.

However, paraphrasing can be a language ability that is very difficult to master for some EFL graduate students (Pinjaroenpan & Danvivath, 2017), even for those majoring in English (Ruslan et al., 2020). Furthermore, a lack of paraphrasing skills could lead to problems with plagiarism amongst others related to report writing. For example, in a study conducted by Loh (2013), plagiarism was

found in academic writing written by Malaysian university students in addition to incomprehensible, inaccurate, and inappropriate paraphrases. Furthermore, in a study carried out in the United States, some L2 college students (e.g., Korean, Japanese, and Chinese) were found to have copied original texts in their academic summary writing (Keck, 2006, 2014). The same problem was reported in a study undertaken with EFL Chinese students (Shi, 2004), while Thai English major graduate students were found to copy most of the original words, and their writing contained only around 50% of textual alteration and meaning preservation even though they knew what plagiarism was (Pinjaroenpan & Danvivath, 2017).

In response to these findings, some researchers have suggested that it may be necessary to provide EFL learners training on paraphrasing techniques (Asmanda & Hafizh, 2021; Chi & Nguyen, 2017). Likewise, some EFL college students have mentioned that they needed more exercises and explanations on paraphrasing from their English instructors (Dung, 2010). Many researchers have also tried to develop paraphrasing skills among EFL learners by providing, for instance, paraphrasing guidelines (Yahia & Egbert, 2023) and explicit instruction on paraphrasing techniques (Choy & Lee, 2012). Experimental studies with a pretest and posttest design have shown that teaching intervention has an effect on students' ability to paraphrase (Choy & Lee, 2012; Injai, 2015; Loh, 2013), and Yahia and Egbert (2022) have reported positive results from instruction on paraphrasing among Ph.D. students from different countries, namely China, Indonesia, Iran, Malaysia, Mexico, Puerto Rico, Saudi Arabia, and Thailand.

However, there are very few research studies focusing on EFL learners' ability to paraphrase hedged statements, and guidance on explicit teaching of paraphrasing of hedges is most notable only in Hyland (1996a). In addition, many previous studies tend to highlight the use of hedges among EFL learners, not their paraphrasing of hedges, and report that learners have difficulty using hedges appropriately (Hyland & Milton, 1997). Their difficulties in using hedges are also evidenced in terms of inappropriate (Hyland, 1996b; Vassileva, 1997), ungrammatical (Petchkij, 2016; Yang, 2013), insufficient (Burrough-Boenisch, 2004; Hyland & Milton, 1997; Prasithrathsint, 2015; Vassileva, 1997, 2001; Ventola, 1997), and unvaried (Dallyono, 2008; Hidayati et al., 2005; Petchkij, 2016; Vassileva, 2001; Ventola, 1997; Yagiz & Demir, 2014) use of hedges. Many scholars have also suggested that EFL teachers should familiarize their learners with

hedges and enable them to use hedges in their academic writing by providing explicit instruction on hedges (Alward, Mooi & Bidin, 2012; Chick, 1996; Hinkel, 1997; Hyland, 1998; Kasper & Schmidt, 1996). Previous studies have reported on the use of explicit teaching of hedges in different groups of EFL learners, such as Iranian students in an IELTS preparation course (Firoozjahantighet al., 2021), Chinese undergraduates (Sun & Hu, 2023), Arab college students (El-Dakhs et al., 2022), international graduate students in the U.S. (Cambodia, Korea, Thailand, Japan, Taiwan, and China) (Wisnoff, 2000), and Thai undergraduate pharmaceutical science students (Petchkij, 2019).

However, to the best of the author's knowledge, there are few, if any, previous studies focusing on paraphrasing skills of EFL medical science graduate students. More importantly, previous studies combining explicit teaching of hedging strategies and paraphrasing techniques cannot be found. The current study, thus, aimed to examine and compare paraphrasing strategies used by Thai and non-Thai EFL medical science graduate students to paraphrase lexical hedges in hedged scientific statements as well as the types of hedges used in their paraphrased versions after receiving explicit teaching of paraphrasing techniques and hedging in academic writing.

2. Literature Review

2.1 Identification and Types of Hedges in Academic Writing

Based on its functional definition, hedges in academic writing are any forms of language that indicate personal propositions of the author rather than a precise fact (Crompton, 1997), or any linguistic forms showing less commitment to the proposition of an utterance (Hyland, 1995, 1998, 2005). As shown in the example (i-ii), the words '*seem,*' '*possible,*' and *'may,*' as well as if clause and agentless structures like "It now seems…" and "It was assumed that…" are considered hedges (Hyland, 1995). This is because without them, the scientific claims made in these two utterances would be stronger and could be assumed by readers to be facts.

(i) *It now seems possible* that the oxygen carrier function *may* be feasible because *if* the hemoglobin in the root were mainly in the tip, it… (Hyland, 1995)

(ii) *It was assumed that* the phosphorylation of EF-2 *may* play a… (Hyland, 1995)

Hedges can generally be divided into three types: lexical, structural, and strategic hedges, according to Hyland (1995, 1998). Lexical hedges include epistemic modals (e.g., *could, might*), verbs (e.g., *appear, suggest*), adjectives (e.g., *possible, likely*), adverbs (e.g., *presumably, perhaps*), nouns (e.g., *tendency, likelihood*), and others (Hyland, 1995, 1998). Structural hedges include, for instance, conditional structures (Hyland, 1998), e.g., *if the hemoglobin*...(ii), agentless structures such as sentences started with 'It is' as in (i-ii) and 'There is' (Luukka & Markkanen, 1997; Martin-Martin, 2008), as well as passive constructions (Hyland, 1998; Luukka & Markkanen, 1997; Martin-Matin, 2008) like "*Liver metastasis were obtained from*..." which can help distance authors from what they report more than phrases like "I/We obtained...". Strategic hedges include how authors refer to previous studies or citations (Markkanen & Schroder, 1997), theories, methodologies, or models (e.g., '*if this scheme is correct,*' '*according to our method*') (Hyland, 1995). They can also mention their inadequate knowledge (e.g., '*it is not known whether...*') (Hyland, 1995) and shortcomings of their research methods or experiments (e.g., '*under these conditions*') (Hyland, 1995, 1998).

It can be seen that the forms of hedges vary (Hyland, 1994), and a form can be considered a hedge as long as it helps distance an author or authors from a statement or proposition and, consequently, reduces their responsibility and any risks in what they say (Markkanen & Schroder, 1997). Furthermore, there is a taxonomy used by Salager-Meyer (1994) in her analysis of hedges in 15 medical science papers which divides hedges into 1) *shields* (e.g., *seem, probably, possibly*) or words used to express possibility, 2) *approximators* (e.g., *approximately, roughly*) or words used as rounders of quantity and degree, 3) *emotionally-charged intensifier* or comment words (e.g., *extremely interesting, dishearteningly weak, particularly encouraging*), 4) *compound hedges* or string of hedges (e.g., *it could be suggested that, it may suggest that*), and 5) *authors personal doubt and direct involvement* (e.g., *I believe, to our knowledge*).

Though Salager-Meyer has found that 90% of hedges in medical science papers are shield, approximator, and compound hedges, types of hedges proposed by Hyland (1995, 1998) and other scholars mentioned earlier seem to be more appropriate for the explicit teaching of hedges in the present study as lexical and structural hedges seem to be broadly categorized based on their syntactic

properties which could be easier to understood by learners. For strategic hedges, although they can be in an unlimited array of language forms based on their meaning, the explicit teaching in this study was limited to how the participants referred to the original sources or citations, integral, and non-integral, (Markkanen & Schroder, 1997), as they are directly related to paraphrasing and plagiarism. This division between integral and non-integral citations follows Swale (1990), who defines integral citations as those where writers include an author name in the actual citing sentence in the form of *Author + integral verb* (e.g., Salager-Meyer has found) or in the form of *noun or preposition phrase* (e.g., … a taxonomy used by Salager-Meyer (1994)), and non-integral citations as where author names are put in parentheses (e.g., (Markkanen & Schroder, 1997)), or included in a footnote, endnote, or numbers appearing in superscripts.

2.2 Previous Studies on EFL Learners' Paraphrasing Strategies

Based on the literature review, some relevant previous studies in the area of EFL paraphrasing skills analyzed and categorized learners' paraphrasing strategies using several criteria.

For instance, many studies tried to categorize EFL learners' paraphrasing techniques using the criteria or taxonomy of paraphrase types proposed by Keck (2006) (as cited in Asmanda & Hafizh, 2021; Ismail et al., 2020; Mira & Fatimah, 2020), Shi (2004) (as cited in Liao & Tseng, 2010), Pieterick (as cited in Asmanda & Hafizh, 2021; Dung, 2010; Injai, 2015), Bailey (2018) (as cited in Ruslan et al., 2020), and Rogers (2007) (as cited in Chi & Nguyen, 2017).

To illustrate, Keck (2006) has classified L2 learners' paraphrasing strategies into four types, namely 1) near copy, 2) minimal revision, 3) moderate revision, and 4) substantial revision containing 50%, 20-49%, 1-29%, or no unique links, respectively, which are strings of exactly copied content words occurring at the same place in the paraphrased and original sentences. Shi (2004) has categorized paraphrasing strategies into three main types as follows: 1) with references to the author of the original text, 2) without references to the author of the original text, and 3) with quotations in which the first and second types are divided further into three sub-types, namely a) closely paraphrased which refers to syntactic and semantic adjustment, b) modified slightly, and c) exactly copied. While Pieterick

divides paraphrasing techniques into three main groups: syntactic (structure and grammar), semantic (word), and organization (idea structure) paraphrases.

In the present study, similar to Pieterick's, EFL graduate students' paraphrasing strategies were syntactically and semantically analyzed and categorized. How they referred to the original sources or citations as mentioned in Shi (2004) were considered strategic hedges. However, the percentage of exactly copied content as suggested by Keck (2006) was not counted or calculated as this study focused only on how EFL graduate students paraphrased hedges appearing in some hedged scientific statements and types of hedges that occurred in their paraphrased versions.

3. Methodology

3.1 Participants

The participants of this study were Thai (TH) and non-Thai (NTH) EFL medical science graduate students studying at a well-known medical school in central Bangkok. TH students (n = 9) were Master's students from the Department of Medical Biochemistry taking a six-day research article reading and writing course, consisting of six three-hour classes, in the second semester of the 2022/23 academic year. NTH students (n = 7) were Master's (n = 5) and doctoral (n = 2) students from medical sciences and clinical sciences programs in the same medical school. They attended a five-day workshop, each lasting three hours, on how to avoid plagiarism in writing scientific research reports held in the same semester and academic year. Their homeland countries were Indonesia (n = 3), Myanmar (n = 1), Pakistan (n = 1), Nigeria (n = 1), and Sudan (n = 1), and their mother tongues were Indonesian, Bahasa Indonesia, Javanese and Indonesian, Urdu, Arabic, Igbo, and Burmese. After the IRB approval (certificate no. 109/66) from the university, signed consent forms were obtained from all participants prior to data collection.

Both groups of participants were considered graduate medical science students in Thailand. They used English as a foreign language, and they attended classes on the same topics. Besides, the classes were taught by the same instructor and coordinated by the same coordinator who provided research articles considered comprehensible for most participants as instructional materials.

Hence, the similarities between the two groups could be assumed for comparative purposes in the present study.

3.2 Research Instruments

Research instruments used in this study were the pretest, posttest, and questionnaires, which were validated by university professors with more than 20 years of expertise in the area of EFL and second language acquisition (SLA) before they were used in data collection.

3.2.1 Pretest and Posttest

The pretest and posttest were the same test containing nine items of authentic hedged statements as shown in the appendix. These nine items were randomly selected from medical science research articles provided by the course coordinator. They contained lexical hedges occurring when the authors cautiously stated their claims or findings, interpretations of results, limitations of the study, implications of findings, and recommendation for further studies. Of these nine items, four contained one lexical hedge (appear, could, should, and will), two contained two lexical hedges (indicate/may and possible/might), and three contained three lexical hedges (may/partly/possible, relatively/show/should, and might/should/would). These lexical hedges could be categorized into four different parts of speech which were modals, verbs, adjective, and adverbs, and they were included in this study as they were among the common lexical hedges in academic writing proposed by Hyland (2005).

3.2.2 The Lessons

There were two main lessons. The first on paraphrasing techniques and second on hedging in medical science papers. The former included definitions of plagiarism and how to avoid plagiarism using paraphrasing techniques, citations, and quotations. Seven paraphrasing techniques were introduced and practiced, namely using synonyms, changing word parts of speech, changing voices, changing conjunctions, combining short sentences, splitting a long sentence, and a combination of these techniques. The lesson on citations included how to write non-integral and integral citations, reporting verbs, and some other useful links e.g., according to, based on, etc. The lessons on hedging included definition, functions, and authentic examples of hedges in medical science papers. Some common lexical (Hyland, 2005) and structural hedges which were limited to

sentences started with 'It is' (Luukka & Markkanen, 1997; Martin-Martin, 2008) were introduced. However, the limited class time was mostly spent on the presentation, practice, and production of lexical hedges. Structural hedges were only presented multiple times through authentic examples in the sample research articles they read in class.

3.2.3 Questionnaires

There were two questionnaires, as shown in the appendix, distributed to all participants through a Google form. The first questionnaire, administered before the courses started, consisted of short-answer questions eliciting participants' demographic data (level of study, nationality, mother tongue, and homeland country), what plagiarism was to them, and paraphrasing techniques they already knew. There were also two Likert scale questions asking participants to rate their perceived current ability in paraphrasing in general and the importance of avoiding plagiarism. As for the second questionnaire administered during the last class of the courses, four Likert scale questions were added asking participants to rate the usefulness of the lessons on paraphrasing techniques and hedging in scientific research reports and their current ability to paraphrase hedged and non-hedged scientific texts after they had learned the lessons. One additional short-answer question asked participants to give suggestions on how to make the lessons better. It is noteworthy that the rest of the questions were the same as those in the questionnaire administered before the courses commenced, but with no items on demographic data.

3.3 Data Collection Procedures

The two questionnaires were responded to in class through Google forms. All participants completed the questionnaire, except one NTH student.

In order to determine the effects of teaching paraphrasing alone compared to teaching both paraphrasing and hedging, the pretest was conducted after the paraphrasing lesson, and the posttest was done in the last class after the combination of paraphrasing and hedging lessons. However, both tests were assigned as homework as in the real world where scientists can usually spend more than limited class time to paraphrase texts when preparing their literature review.

As there were nine items in the tests, the data for analysis from the TH group were 81 paraphrased items from each test. As regards the NTH group, only 43 paraphrased items from the pretest and 45 from the posttest were obtained as two NTH participants did not paraphrase every item in the tests, two did not do the pretest, and two did not do the posttest.

3.4 Data Analysis

The paraphrased versions written by the participants were analyzed and compared in terms of 1) paraphrasing strategies that they used to paraphrase the lexical hedges given in order to keep the hedged sense of the original version and 2) types of hedges (Hyland, 1995, 1998) used in their paraphrased versions. The pretest and posttest were compared both within groups and across groups.

As shown in examples (1)-(6), the analysis steps started by dividing participants' paraphrased where hedges were identified based on the functional definition of hedge proposed by Crompton (1997) and Hyland (2005). Hedged items were those containing any items into non-hedged (1) and hedged (2-6) item types of hedges, while non-hedged items contained none. Analysis of grammatical errors and typos was not in the scope of this study. However, they were still kept in the authentic examples shown in this paper and marked with a * symbol (3), (5-6).

Original 1: An increased helical propensity at the nucleation site appears to stabilize the folding nucleus and results in an increased folding rate constant.

Non-hedged:

(1) *The folding rate constant happened due to increased helical propensity at the nucleation site stabilizing the folding nucleus. (NTH6-post)

Hedged:

(2) Elevated helical propensity at the nucleation site *appears to* fortify the folding nucleus, thereby leading to an acceleration in the rate constant of the folding reaction (Neuwiler et al., 2009). (NTH1-post)

(3) *Nucleation site *was appeared* to balance folding nucleus because rise helical propensity and effect to high-rise folding rate steady. (TH1-pre)

(4) A rise in the helical propensity at the point of nucleation *seems* to provide stability to the folding nucleus and leads to an enhancement in the rate of folding. (NTH1-pre)

(5) *Neuweiler et al. revealed the *appearance* of an increased helical propensity at the nucleation site which stabilize the folding nucleus and results in an increased folding rate constant. (TH2-pre)

(6) *According to Neuweiler et al., Stabilizing the folding nucleus and increasing folding ratio constant *could be observed* by increasing helical propensity at nucleation. (TH6-post)

Lexical hedges were then classified into groups according to their parts of speech. As for strategic hedges, non-integral citations e.g., (Neuwiler et al., 2009) (2) and integral citations e.g., Neuweiler et al. revealed... (5) and According to Neuweiler et al. (6) were identified. Integral citations were then further linguistically analyzed and categorized into groups according to their forms and structures such as 'author and a reporting verb' (5), 'according to + author' (6), and others.

Structural hedge sentences starting with 'It is' and functioning as hedges were identified. As shown in examples (7)-(8), "it is suggested by" (NTH) and "it was found that" (TH) were found in the posttest. They seemed to be modified from 'indicate,' the given hedge in the original version of Item 3. Also, they somewhat helped distance the authors from what they said. In these two examples, the word 'may' and 'possibly' also showed how the given hedge 'may' was directly used in (7) and was paraphrased into 'possibly,' another lexical hedge with a different part of speech, in (8).

Item 3 : The results of Kaplan-Meier survival curves and Cox multivariate analysis *indicate* that overexpression of G6PD *may* be an independent predictor of poor clinical outcome and decreased survival.

(7) *It is suggested by* the findings of the Cox multivariate analysis and Kaplan-Meier survival curves that overexpression of G6PD *may* be a standalone predictor of poor clinical outcome and lower survival. (NTH4-pre)

(8) The expression of G6PD are displayed by Kaplan-Meter survival curves and Cox multivariate analysis, *it was found that* overexpression of G6PD *possibly* an independent predictor of poor clinical outcome and decreased survival.* (TH3-post)

With regard to paraphrasing strategies, the analysis unit was hedging devices found in participants' paraphrased versions. They were analyzed in terms of how the given hedges were paraphrased. After that, their paraphrasing strategies were categorized into, for instance, *using the given hedge as is* e.g., 'appear' (2), changing with synonyms e.g., 'seem' (4), 'observe' (6), *changing parts of speech* e.g., 'appearance' (5), and *changing voices* e.g., 'was appeared*' (3) and 'could be observed' (6). In this study, *changing with synonyms* referred to when non-given lexical hedges (e.g., seem, observe) having the same parts of speech as the given hedges (appear) were used in the paraphrased version.

Raw frequencies of each hedge and paraphrasing strategy were also counted and calculated into mean ($\bar{x}$) values and percentages for the comparison as the number of participants in both groups were not equal. Qualitative data were also linguistically analyzed.

4. Findings

Regarding hedged and non-hedged paraphrased items, the average numbers of hedged items in both groups and tests were much more than those of their non-hedged items (Table 1). In terms of the total numbers of hedges that each group used, TH participants ($\bar{x} = 15.9$) used more hedges than the NTH group ($\bar{x} = 14.2$) in the pretest; however, these numbers were comparable in the TH ($\bar{x} = 19.1$) and NTH ($\bar{x} = 19.6$) posttests. For types of hedges, both groups used lexical hedges most, followed by strategic hedges and structural hedges, respectively. Additionally, higher numbers of each type of hedge were found in both groups in the posttest, particularly structural and integral hedges which were around two to three times more prevalent in their posttest, though with low raw frequencies.

Table 1

The numbers of non-hedged and hedged items and types of hedges in the paraphrased versions

Types of hedge	Thai (9)		Non-Thai (5)	
	Pretest (9)	Posttest (9)	Pretest (5)	Posttest (5)
Non-hedged	$\bar{x}$ = 1.1 (10)	$\bar{x}$ = .7 (6)	$\bar{x}$ = .6 (3)	$\bar{x}$ = .4 (2)
Hedged	$\bar{x}$ = 15.9 (143)	$\bar{x}$ = 19.1 (172)	$\bar{x}$ = 14.2(71)	$\bar{x}$ = 19.6(98)
Lexical	$\bar{x}$ = 10.3(93)	$\bar{x}$ = 13.1 (118)	$\bar{x}$ = 11.6 (58)	$\bar{x}$ = 12.8 (64)
Structural	$\bar{x}$ = .2 (2)	$\bar{x}$ = .7 (6)	$\bar{x}$ = .2 (1)	$\bar{x}$ = .4 (2)
Strategic	$\bar{x}$ = 5.3 (48)	$\bar{x}$ = 5.3 (48)	$\bar{x}$ = 2.4 (12)	$\bar{x}$ = 6.4 (32)
integral	$\bar{x}$ = 0.8 (7)	$\bar{x}$ = 1.6 (14)	$\bar{x}$ = 1.2 (6)	$\bar{x}$ = 3.8 (19)
non-integral	$\bar{x}$ = 4.6 (41)	$\bar{x}$ = 3.8 (34)	$\bar{x}$ = 1.2 (6)	$\bar{x}$ = 2.6 (13)

$\bar{x}$ =mean

4.1 Lexical Hedges

As for lexical hedges (Table 1), TH participants ($\bar{x}$ = 10.3) used lexical hedges slightly less than the NTH ($\bar{x}$ = 11.6) in the pretest. However, in the posttest, lexical hedges were used at comparable numbers by both TH ($\bar{x}$ = 13.1) and NTH ($\bar{x}$ = 12.8) participants.

Moreover, both groups mostly used the given lexical hedges in both tests as can be seen in their word choices in Table 2. However, 12 non-given lexical hedges could be found in the TH participants (*suggest, partially, possibly, maybe, relatively, probable, appearance, tendency, part of, likely, potential* (n.), and *promise* (n.)), and 11 were used by the NTH participants (*suggest, seem, partially, potential* (adj.), *partial, tendency, promise, possibly, probably, partial,* and *suggestion*). Interestingly, it can be seen that some of them were nouns, though no nouns were given as hedges in the tests.

It can also be noticed in Table 2 that both groups used some similar non-given lexical hedges, and some of them were actually the given hedges with different parts of speech. For example, the non-given hedge '*appearance'* in example (5) seemed to be modified from the verb 'appear' given in the original Item 1. Moreover, some of the non-given hedges found in the posttest were already used in the TH pretest (*suggest, partially,* and *possibly*) and NTH pretest (*suggest, seem, partially,* and *potential*) before participants took the lessons on hedging.

Table 2

Lexical hedges and their average and raw frequencies found in the TH and NTH paraphrased versions

Given lexical hedges (11)	**Thai**		**Non-Thai**	
	Pretest (20)	**Posttest (17)**	**Pretest (16)**	**Posttest (17)**
Modals (11): should (3), may (2), might (2), can (1), could (1), will (1), would (1)	$\bar{x}$ = 7.3 (66) should (19), may (13), will (9), might (8), can (7), could (7), would (3)	$\bar{x}$ = 8.9 (80) should (24), may (21), might (11), could (9), will (7), can (5), would (3)	$\bar{x}$ = 7.4 (37) should (13), may (11), could (8), might (2), can (2), will (1)	$\bar{x}$ = 7.8 (39) could (12), may (10), should (9), would (3), might (2), will (2), can (1)
Verbs (2): appear (1), indicate (1)	$\bar{x}$ = .8 (7) appear (2), indicate (3), suggest (2)	$\bar{x}$ = 2 (18) appear (3), indicate (4), suggest (11)	$\bar{x}$ = 2.4 (12) indicate (2), suggest (7), seem (3),	$\bar{x}$ = 2.8 (14) appear (1), suggest (12), seem (1),
Adverbs (2): partly (1), relatively (1)	$\bar{x}$ = 1 (9) relatively (3), partially (1) possibly (1), maybe (4),	$\bar{x}$ = 1.4 (13) relatively (4), partially (4) possibly (5),	$\bar{x}$ = .8 (4) partly (1), relatively (2) partially (1)	$\bar{x}$ = 1.2 (6) relatively (2), partially (1) possibly (2), probably (1),
Adjective (2): possible (2)	$\bar{x}$ = .9 (8) possible (6), relative (1), probable (1)	$\bar{x}$ = .67 (6) possible (5) likely (1)	$\bar{x}$ = .6 (3) potential (2), partial (1)	$\bar{x}$ = .8 (4) potential (3), partial (1)
Noun: -	$\bar{x}$ = .2 (2) appearance (1), tendency (1), part of (1)	$\bar{x}$ = .1 (1) potential (1), promise (1)	$\bar{x}$ = 1.4 (7) tendency (1), promise (1)	$\bar{x}$ = 1.4 (7) suggestion (1)
Total	$\bar{x}$ = 10.3 (93)	$\bar{x}$ = 13.1 (118)	$\bar{x}$ =11.6 (58)	$\bar{x}$ = 12.8 (64)

4.2 Strategic Hedges

As shown in Table 1, the average number of all strategic hedges used by the TH participants was the same in both tests at $\bar{x}$ = 5.3 which was much higher than that of the NTH pretest ($\bar{x}$ = 2.4), but lower than the NTH posttest ($\bar{x}$ = 6.4). The linguistic analysis (Table 3) revealed that, in the pretest, TH participants used

many more non-integral citations ($\bar{x}$ = 4.6) than the NTH learners did ($\bar{x}$ = 1.2). However, the NTH group used integral citations more often in both their pretests ($\bar{x}$ = 1.2) and posttests ($\bar{x}$ = 3.8) when compared with the TH pretests ($\bar{x}$ = 0.8) and posttests ($\bar{x}$ = 1.6). Moreover, further linguistic analysis revealed that only three main groups of linguistic devices were used by both groups as integral citations to refer to previous studies: 1) author and a reporting verb, 2) according to and authors, and 3) others.

As regards the 'author and a reporting verb' structure, TH participants used only three reporting verbs (i.e., *state*, *suggest*, and *reveal*) in their pretest, and six more new ones could be found in their posttest (i.e., *found, indicate, recommend, report, show,* and *support*). For the NTH participants, they used three reporting verbs (i.e., *describe, propose,* and *suggest*) in their pretest and three more new ones (i.e., *acknowledge, show,* and *collect*) in their posttest. Some of these reporting verbs are shown in the examples (5) and (9)-(12).

(9) In 2014, *Mabey et al. stated* that a cross-sectional study with a relatively small sample size could not establish... (TH2-pre)

(10) *as *described by Thomas et al* (6). An elevated folding rate constant is produced by an increased helical propensity at the... (NTH5-pre)

(11) *Vanessa et al *reports* the subject of further studies may be hydrophilic interface. (TH7-post)

(12) *Pimpakan et al *suggest* that packed red cell hemolysate should be used to derive Hb values from the automated UV enzymatic method for normalizing G6PD activity. (4) (NT5-post)

Table 3

Strategic hedges and their frequencies

Strategic hedges	Thai		Non-Thai	
	Pretest (9)	Posttest (9)	Pretest (5)	Posttest (5)
Non-integral	$\bar{x}$ = 4.6 (41)	$\bar{x}$ = 3.8 (34)	$\bar{x}$ = 1.2 (6)	$\bar{x}$ = 2.6 (13)
Integral	$\bar{x}$ = .8 (7)	$\bar{x}$ = 1.6 (14)	$\bar{x}$ = 1.2 (6)	$\bar{x}$ = 3.8 (19)
Author + reporting verb	$\bar{x}$ = .8 (7)	$\bar{x}$ = 1.2 (11)	$\bar{x}$ = 1 (5)	$\bar{x}$ = 2 (10)
According to...	0	$\bar{x}$ = .1 (1)	0	$\bar{x}$ = 1.6 (8)
Others	0	$\bar{x}$ = .2 (2)	$\bar{x}$ = .4 (2)	$\bar{x}$ = .4 (2)

For the “according to” link, it was not found in the pretest of both groups, but some could be found in the TH ($\bar{x}$ = .1) and NTH ($\bar{x}$ = 1.6) posttest. In their posttest, the NTH group also used a variety of words with this link such as “According to the literature” (13), “According to the study by…” (14), “According to the author of a previous study” (15), “According to the author,” and “According to the authors’ suggestion,” while TH participants used only one form which was “According to Neuweiler et al.” (16).

(13) *According to the literature*, an augmented helical… (NTH3-post)
(14) *According to the study by Morris et al., 2013*, it was… (NTH1-post)
(15) *According to the authors of a previous study*, "This is a… (NTH1-post)
(16) *According to Neuweiler et al.,* Stabilizing the folding… (TH6-post)

Other forms of participants’ strategic hedges were the use of the words “previous study/report” with and without reporting verbs. It was found that TH participants used only “previous reports” (17) twice, while a greater variety of forms could be found in the NTH participants such as “a previous study” (18), “A recent study” (19), and “studies” (20). These forms were found in the NTH pretest and TH and NTH posttest with low frequencies.

(17) These results are in agreement with *previous reports* (TH6-post)
(18) *In a previous study*, the analysis results of the Cox… (NTH5-pre)
(19) *A recent study* [5] suggested that caffeinated coffee… (NTH3-post)
(20) *Studies* have reported that the prevalence of G6PD… (NTH3-post)

For non-integral citations (Table 1), TH participants used many more of them in the pretest ($\bar{x}$ = 4.6) when compared to those used by the NTH pretest ($\bar{x}$ = 1.2). However, in the posttest, TH participants used non-integral citation less ($\bar{x}$ = 3.8), while the NTH group used non-integral citations more ($\bar{x}$ = 2.6). Non-integral citations that they used were in two formats: 1) (author, year) in examples (2) and (23), and 2) numbers e.g., (6), (4), [5] in examples (10), (12), and (19), respectively.

4.3 Structural Hedges

Structural hedges, ‘It is’ structure, were used, as shown in examples 7 and 8 above and 21-24 below, the least by both TH and NTH participants. In their

pretest, both groups used 'It is' structure at the same average frequency at $\bar{x} = 0.2$ (Table 1). However, in their posttest, TH participants ($\bar{x} = 0.7$) used this structure more often than the NTH participants ($\bar{x} = 0.4$).

(21) However, in comparing female newborns and male newborns G6PD intermediates, *it was found to be* more prevalent in females than Ø males newborns. (TH3-pre)

(22) *Jiyoung Kim et al. suggest *it is possible* that NQO1 expression was an effect by Nrf2-induced as a result of neuroprotection mediated against H2O2. (TH6-post)

(23) Therefore, *it is unable to* establish definitive causal relationships. (IT1-pre)

(24) According to the findings of the Kaplan-Meier survival curves and Cox multivariate analysis, *it is suggested that* the upregulation of G6PD could be a potential prognostic indicator for reduced survival and unfavorable clinical outcome. (IT3-post)

4.4 Paraphrasing of Hedges

Of participants' paraphrasing strategies, only four main strategies were found in both tests and groups as shown in Table 4, namely 1) using synonyms of the given hedges, 2) using the given hedge directly, 3) changing voices, and 4) changing parts of speech of the given hedges, respectively.

Table 4

Paraphrasing strategies used to paraphrase the given hedges and their frequency

Paraphrasing of hedges	Thai		Non-Thai	
	Pretest (9)	Posttest (9)	Pretest (5)	Posttest (5)
Using synonyms	$\bar{x}$ = 3.6 (32)	$\bar{x}$ = 4.9 (44)	$\bar{x}$ = 6.2 (31)	$\bar{x}$ = 4.6 (23)
Changing the voices	$\bar{x}$ = 2.1 (19)	$\bar{x}$ = 2.4 (22)	$\bar{x}$ = 1.8 (9)	$\bar{x}$ = 1.2 (6)
Using the given hedges	$\bar{x}$ = 2.2 (20)	$\bar{x}$ = 1.4 (13)	$\bar{x}$ = 1.4 (7)	$\bar{x}$ = 2 (10)
Changing parts of speech	$\bar{x}$ = .6 (5)	$\bar{x}$ = .8 (7)	$\bar{x}$ = .2 (1)	$\bar{x}$ = .4 (2)

4.4.1 Using Synonyms of the Given Hedges

This strategy was used most by both groups and tests (Table 4). As mentioned in the methods section, the use of synonyms in this study referred to a technique implemented when different lexical hedges with the same parts of

speech were used in the paraphrased version. Example 4 above shows how the verb 'seem' was used as a hedge instead of the verb 'appear.' Other examples in (21)-(22) show when the modal 'would' in the original Item 9 was substituted with the modals 'will' and 'could' in participants' paraphrased versions.

Item 9: This is undoubtedly an area where future research *would* be highly fruitful.

(21) Future research in this area *will* be greatly useful. (TH5-pre)

(22) ..., which is an area where future studies *could* provide valuable insights. (NTH3-post)

Moreover, in the pretest, the NTH participants ($\bar{x}$ = 6.2) used synonyms much more often than the TH participants ($\bar{x}$ = 3.6) did. However, in the posttest, TH ($\bar{x}$ = 4.9) and NTH participants ($\bar{x}$ = 4.6) used comparable numbers of synonyms.

4.4.2 Changing Voices

Based on the data, changing voice came second in the TH group, and it was used in the TH pretest ($\bar{x}$ = 2.1) and posttest ($\bar{x}$ = 2.4) more often than in the NTH pretest ($\bar{x}$ = 1.8) and posttest ($\bar{x}$ = 1.2). Example (6) above shows when an active form given hedge 'appear' was changed into an ungrammatical passive form 'was appeared*.' Furthermore, example 23 shows when a modal passive form 'should be derived', given in the original Item 7, was changed into an active form 'might be suitable to evaluate*'.

Item 7: We propose that Hb values suitable for normalization of G6PD activity from the automated UV enzymatic method *should be derived* from the packed red cell hemolysate, rather than from the whole blood.

(23) *It is suggested that packed red cell hemolysate *might be suitable to evaluate* Hb values for normalization of GGPD activity from the automated UV enzymatic method (Morris et. al., 2003). (TH2-post)

4.4.3 Using the Given Hedges

The TH group ($\bar{x}$ = 2.2) used this strategy more often than the NTH group ($\bar{x}$ = 1.4) in the pretest. Nevertheless, in the posttest, the NTH group ($\bar{x}$ = 2) used this strategy more often than the TH group ($\bar{x}$ = 1.4). Examples (24)-(25) show when the given hedge 'would' in the original Item 9 mentioned earlier was still used in the paraphrased versions.

(24) Future study in this area *would* be very useful. (TH7-pre)

(25) Future study in this area *would* surely be very productive. (NTH6-post)

4.4.4 Changing Parts of Speech

Both groups of participants used this strategy the least, and they used it slightly more often in the posttest. In addition, the TH participants used this strategy in their pretest ($\bar{x} = .6$) and posttest ($\bar{x} = .8$) slightly more often than the NTH group did in their pretest ($\bar{x} = .2$) and posttest ($\bar{x} = .4$). Examples are when the given verb 'appear' was changed into a noun 'appearance' (5) and a modal 'could' (6). In addition, examples (26)-(27) show when the modal 'would' + adjective in 'would be highly fruitful' in the original Item 9 was changed into the verb 'hold' + noun in 'holds promise' (26) and 'holds…potential' (27) in order to keep the hedged sense of the original version.

Item 9: This is undoubtedly an area where future research *would* be highly fruitful.

(26) This area of research undoubtedly holds promise for future studies. (NTH1-pre)

(27) This area of research holds significant potential for fruitful exploration in the future. (TH5-post)

4.5 Participants' Opinions of the Lessons

Based on their responses in the two questionnaires (Table 5), the TH participants rated their ability to avoid plagiarism in general at around 3 out of 5 both before and after the teaching intervention, whereas the NTH participants rated themselves slightly lower in the pretest at $\bar{x} = 2.3$, before their confidence in avoiding plagiarism increased to $\bar{x} = 3.5$ in the posttest.

Table 5

Participants' opinions before instruction

Participants' opinions	Thai		Non-Thai	
	1st Q (9)	2nd Q (9)	1st Q (6)	2nd Q (7)
Ability to avoid plagiarism	$\bar{x}$ = 3 (27)	$\bar{x}$ = 3.2 (29)	$\bar{x}$ = 2.3 (14)	$\bar{x}$ = 3.5 (25)
Importance of avoiding plagiarism	$\bar{x}$ = 4.8 (44)	$\bar{x}$ = 4.5 (41)	$\bar{x}$ = 4.8 (29)	$\bar{x}$ = 5 (35)

Moreover, as can be seen in Table 6, both TH and NTH groups thought the lessons on hedging in scientific research reports (4.9 and 4.9) and paraphrasing techniques (4.8 and 4.9) were very useful for them as the average scores they gave for both lessons were nearly 5 out of 5. However, at the end of the course and workshop in which the same lessons were taught, the TH and NTH participants rated their own ability in paraphrasing hedged statements at only $\bar{x}$ = 3.1 and $\bar{x}$ = 3.7, respectively, which were comparable to their ability in paraphrasing non-hedged statements at $\bar{x}$ = 3 and $\bar{x}$ = 3.7, respectively.

Table 6

Participants' opinions after instruction

Participants' opinions	Thai	Non-Thai
Usefulness of the lessons on hedges	$\bar{x}$ = 4.9 (44)	$\bar{x}$ = 4.9 (34)
Usefulness of the lessons on paraphrasing techniques	$\bar{x}$ = 4.8 (43)	$\bar{x}$ = 4.9 (34)
Ability to paraphrase hedged statements	$\bar{x}$ = 3.1 (28)	$\bar{x}$ = 3.7 (26)
Ability to paraphrase non-hedged statements	$\bar{x}$ = 3 (27)	$\bar{x}$ = 3.7 (26)

Both groups of participants thought that avoiding plagiarism was very important as they rated it between 4.5 and 5 in both tests (Table 5). When they were asked about what could help make the lessons better, one-third of the TH participants (33.3%) and approximately one-sixth of the NTH participants (16.7%) agreed that more exercises would be helpful for them. The rest of the TH participants also specifically asked for some more writing and reading exercises (22.2%), paraphrasing techniques (11%), grammar lessons (11%), and group work (11%), while 16.7% of the NTH participants asked for "more classes."

However, most of the NTH participants (83.3%) seemed to be satisfied with the lessons as can be seen in their opinions shown below.

(28) "*This workshop is very helpful for me and the lessons, exercises, and other class activities were very useful for the course*."

(29) "*I think every class was very good. [Instructor] taught us in an effective way. It is just unfortunate I couldn't attend all of the classes due to several reasons*."

(30) "*The class is great, and I barely found another thing that could improve it*."

When asked "what are paraphrasing techniques?," two NTH participants included the word 'hedges' in their answers in the second questionnaire as shown in examples (31)-(32), while this was not found in their first questionnaire and in the TH group.

(31) "*Changing word choice, grammar, word structure, hedges, and active-passive voice.*"

(32) "*Use hedges, change the order of the sentence, and change the grammatical structures*."

5. Discussion

When paraphrasing hedged scientific texts, Thai and non-Thai medical science graduate students in this study used four main paraphrasing strategies to paraphrase the lexical hedges given which were 1) using synonyms, 2) changing voices, 3) using the given hedges directly, and 4) changing parts of speech, respectively. Regarding hedge types, three types of hedges were found in the participants' paraphrased versions: lexical, strategic, and structural hedges, respectively, based on their high to low frequencies. As for lexical hedges, modals were used most in both tests and by both groups, followed by verbs, adverbs, adjectives, and nouns, respectively. This order was also found in Vietnamese and other non-native English research article writers (Thao & Thiep, 2022).

The higher numbers of all hedges found in the posttest of both groups seemed to reflect that teaching paraphrasing techniques alone may not be enough to raise EFL learners' awareness of keeping the hedged sense of the original version. This may support the need of explicit instructions on paraphrasing of

hedges as suggested by Hyland (1996a). Regarding their non-given hedges that were the given hedges with different parts of speech, this could also possibly be considered a positive effect of teaching hedging in combination with paraphrasing techniques. To illustrate, when EFL learners could identify hedges in the original version, but their hedge bank was still small, they could paraphrase those hedges instead to keep the hedged sense. Additionally, the study participants' high frequency of modal use found in both tests might have also reflected their limited hedge bank stage. Similarly, deficiency in vocabulary was also reported in Indonesian (Asmanda & Hafizh, 2021), English major Thai graduate (Pinjaroenpan & Danvivath, 2017), and Vietnamese undergraduate students (Chi & Nguyen, 2017).

As for structural hedges, the higher frequency of participants' sentences starting with 'It is' in the posttest could partially be the effect of the explicit teaching. Though this structural hedge was only orally introduced several times in classes by the instructor, they became a choice for some EFL medical science graduate students in this study. EAP teachers with limited class time may, therefore, consider using this teaching strategy to model additional hedges for their students. Regarding strategic hedges, though the citations found in this study could be the effect of the lessons on paraphrasing techniques alone, the higher numbers of integral citations in the posttest may somewhat imply the effect of the explicit teaching of reporting verbs, some useful links like 'according to,' as well as their function as hedges. In addition, the way the TH participants mostly used non-integral citations in their pretest, and the very low use of both types of citations in the NTH pretest after the paraphrasing lesson alone, could also possibly help support the important role of the combination teaching techniques used in this study.

In terms of structural hedges, the higher numbers of sentences starting with 'It is' in the posttest could also have partially been the effect of the explicit teaching of hedging. Though this structural hedge was only orally introduced several times in classes through authentic examples appearing in the authentic research articles participants read due to the limited class time, it was used as a hedge by some participants in this study. EAP teachers with limited class time may, then, consider using this teaching technique to add up some inputs of hedge vocabulary for their EFL learners. Regarding their strategic hedges, though the very high number of

non-integral citations found in the TH pretest could imply the effect of the lesson on paraphrasing techniques alone, the very low use of citations in the NTH pretest may, in contrast, have reflected that paraphrasing lessons alone might not be enough to raise learners' awareness of referring to sources in academic writing. Moreover, the higher number of integral citations in the TH and NTH posttests may have somewhat reflected the effect of explicit teaching of reporting verbs, some useful links like 'according to,' as well as their function as hedges.

Regarding participants' paraphrasing strategies, their low use of *changing parts of speech* and high use of *changing with synonyms* strategies when paraphrasing hedges may have indicated their preference for lexical modification over syntactic. This is in agreement with what has been reported in some previous studies of EFL college students in Thailand (Injai, 2015), Indonesia (Asmanda & Hafizh, 2021), Korea (Ji, 2012), and Vietnam (Chi & Nguyen, 2017) who tend to paraphrase by changing words with their synonyms most, and that EFL learners tend to paraphrase at word and phrase levels rather than sentence and paragraph levels (Dung, 2010). In addition, participants' low use of the '*changing parts of speech*' strategy seemed to be in line with grammatical errors found in their paraphrased versions and the fact that a TH participant asked for some more lessons on English grammar. This could possibly also point to the effect of their insufficient English grammar background knowledge on paraphrasing choices and their ungrammatical or inappropriate paraphrases which were also found in Malaysian university students (Loh, 2013) and undergraduate EFL Indonesian students (Asmanda & Hafizh, 2021).

In addition, the findings from the questionnaires seemed to reflect that the teaching techniques used in this study could, at least, help raise medical science graduate students' awareness of expected academic writing conventions in their scientific research community. Their requests for more class time, exercises, reading, paraphrasing techniques, and examples from both groups might have also indicated their needs to further develop their own hedging and paraphrasing skills. These requests, to some extent, were in line with the request from EFL Vietnamese students on more exercises on paraphrasing reported by Dung (2010).

6. Limitations and Recommendations

There are some limitations of this study that should be considered. First, as the number of participants in each group in this study was somewhat small and the generalizability of the results could be low, future studies with a larger sample size are still needed to confirm the results of the current study. However, as research studies focusing on paraphrasing of hedges particularly in medical scientific texts are currently rare, the results of this study still provide some valuable insight and guidelines for EAP teachers and researchers in this area. Second, the given hedges in this study were only lexical hedges which may have partially led to the use of lexical hedges, rather than structural and strategic hedges. Future studies, therefore, could be conducted with the use of prompts with other types of hedges. Finally, though the lexical hedges given covered four different parts of speech, no noun was given, and the number of modals were higher than others. This might, to some extent, have affected the high use of modals in the results, though the higher number of modals in the posttest could also actually indicate their preferences. Future studies may consider selecting lexical hedge prompts with comparable numbers of parts of speech to reduce this probable bias.

7. Conclusion

In conclusion, EFL medical science graduate students in this study increased their use of hedging devices at lexical, structural, and strategic levels after a combination of explicit teaching of hedging in scientific research reports and paraphrasing techniques. The explicit teaching also seemed to help raise these EFL students' awareness of the expected academic writing convention in their scientific research community. Additionally, the results and design of the lessons in this research may shed some light on how pragmatic aspects of academic English can be explicitly taught as hedging is considered a pragmatic competence (Kasper & Schmidt, 1996), and the use of hedges by EFL students needs not only their linguistic, but also their pragmatic knowledge and skills (Clemen, 1997).

8. About the Author

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11. Appendix

11.1 Pretest and posttest

Instructions: You are a scientist who is writing research reports. You would like to cite the following texts from some previous studies. The following information are from different research articles and the reference list is provided at the end of the exercise. Please read and then write down to show how you would you cite each of them. Write your answers on the blank paper given or type them using your personal computer.

1. An increased helical propensity at the nucleation site appears to stabilize the folding nucleus and results in an increased folding rate constant. (ref. 3)
2. The possible neuroprotection mediated by caffeinated coffee, decaffeinated coffee, and chlorogenic acid against H2O2 may be at least partly due to Nrf2-induced modulatory effects on NQO1 expression. (ref. 5)
3. The results of Kaplan–Meier survival curves and Cox multivariate analysis indicate that overexpression of G6PD may be an independent predictor of poor clinical outcome and decreased survival. (ref.1)
4. However, G6PD intermediate was more prevalent in female newborns than in male newborns. The possible reasons for the differences might be random X inactivation of female heterozygotes. (ref. 2)
5. This is a cross-sectional study with a relatively small sample size; such a study cannot establish definite cause-and-effect relationships. It shows some association and is hypothesis generating. The conclusions drawn from our data should be applied with caution to other populations. (ref. 7)
6. Further studies examining sclerostin expression in local tissues, in relation to the synovial and circulating sclerostin levels, could provide a more valuable insight into the pathogenic role of sclerostin in OA. (ref.7)
7. We propose that Hb values suitable for normalization of G6PD activity from the automated UV enzymatic method should be derived from the packed red cell hemolysate, rather than from the whole blood. (ref.4)
8. Whether rodlets form by a simple addition of monomers onto the growing fibril or through other intermediate oligomeric species that are only present at a hydrophobic: hydrophilic interface will be the subject of further studies.

(ref.4)

9. We did not collect synovial fluid samples from healthy controls due to ethical reasons, which might induce some bias. Third, sclerostin levels were only measured in the plasma and synovial fluid. Hence, forthcoming studies should assess whether the mutations in NS1 and NS5 observed here fall into antibody or CTL epitopes. This is undoubtedly an area where future research would be highly fruitful. (ref. 6)

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11.2 Questionnaires

Questionnaire 1

Instructions: Please answer the following questions about yourself. There is no right or wrong answer and no score. You can write your answer in English or Thai.

1. You are a ☐ master ☐ Ph.D. student.
2. Your nationality is _____
3. Your mother tongue is _____
4. What country are you from? _____
5. What is plagiarism?
6. How would you rate the importance of “avoiding plagiarism”? Please circle a number below. Why?

Very low	Low	Moderate	High	Very high
1	2	3	4	5

7. How would you rate your current ability to avoid plagiarism when writing scientific reports in English? Please circle a number below.

Very poor	Poor	Fair	Good	Very good
1	2	3	4	5

8. How can we avoid plagiarism when writing scientific reports? Please specify in details.
9. What is paraphrasing?
10. What are paraphrasing techniques?

Questionnaire 2

Instructions: Please answer the following questions about yourself. There is no right or wrong answer and no score. You can write your answer in English or Thai.

1. What is plagiarism?
2. How can we avoid plagiarism when writing scientific reports in English? Please specify in details.
3. How would you rate the importance of “avoiding plagiarism”? Please circle a number below. Why?

Very low	Low	Moderate	High	Very high
1	2	3	4	5

4. How would you rate your current ability to avoid plagiarism when writing scientific reports in English? Please circle a number below.

Very poor	Poor	Fair	Good	Very good
1	2	3	4	5

5. What is paraphrasing?
6. What are paraphrasing techniques?
7. How would you rate the usefulness of the lessons on paraphrasing techniques for your research report writing? Please circle a number below.

Very Low	Low	Moderate	High	Very high
1	2	3	4	5

8. How would you rate the usefulness of the lessons on hedges for your research report writing? Please circle a number below.

Very Low	Low	Moderate	High	Very high
1	2	3	4	5

9. What do you think can help make the lessons, exercises, and other class activities of this course to be better?
10. How would you rate your current ability to paraphrase hedged statements? Please circle a number below.

Very poor	Poor	Fair	Good	Very good
1	2	3	4	5

11. How would you rate your current ability to paraphrase non-hedged statements? Please circle a number below.

Very poor	Poor	Fair	Good	Very good
1	2	3	4	5