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The Moderating Effect of the Need for Cognition and language proficiency on EFL Students' Response to Reading Comprehension Monitoring Instruction

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Abstract

The present study aimed at investigating the instructional effectiveness of two methods of inducing metacognitive-monitoring in facilitating students' reading comprehension. It also examined whether an interaction exists between type of self-monitoring instruction, EFL learners' need for cognitive style and their language proficiency. A sample of EFL 121 first year university female students, enrolled at Kuwait University, College of Science, comprising four intact classes were chosen as the sample of the current study. Two classes of 62 were exposed to a modified text coding (MTC) treatment (text coding followed by responding in reading logs). The other two classes of 59 students were exposed to the (TC) treatment (text coding followed by reciprocal thinking aloud). Three instruments were utilized: a placement test and, a reading comprehension test and the need for cognition. (NFC) scale. Findings revealed that there is an interaction found between language proficiency, need for cognition and instructional treatment at the inferential level, in that low in NFC tended to perform better in the MTC whereas high in NFC learners performed better in the TC treatment. However, no interaction was found at the literal level. It was concluded that targeted interventions aimed at directing students, of various learning styles, to self-monitor their reading comprehension have to be devised to ensure that those students' learning strengths and deficiencies are properly addressed.

" الأثر المعدل لمتغيري الحاجة إلى لمعرفة والكفاءة اللغوية على استجابة طلاب اللغة الإنجليزية كلغة أجنبية لإستراتيجيات تدريسية لتنمية المراقبة ما وراء المعرفية للفهم القرائي "

● **مستخلص الدراسه** :

هدفت الدراسة الحالية إلى مقارنة أثرإستراتيجيتن تدريسيتين لتنمية المراقبة ما وراء المعرفية للفهم القرائي لدى عينة من طلاب اللغة الانجليزية كلغة أجنبية. كما سعت هذه الدراسة إلى الكشف عن مدى تأثير التفاعل بين كل من الاستراتيجية التدريسية المستخدمة، متغير الحاجة للمعرفة والكفاءة اللغوية للطلاب على مهارات الفهم القرائي الحريَ والاستنتاجي. تكونت عينة الدراسة من١١٢ طالبة بالسنة الأولى بكلية العلوم، بجامعة الكويت تم توزيعهن على مجموعتين تجريبيتين. المجموعة الأولى تكونت من ٦٢ طالبة وتعرضت للمعالجة باستخدام طريقة تكويد النص والذي يعقبه استخدام استراتيجية التفكير التبادلي بصوت عالي بين الطلاب، بينما تعرضت المجموعة الثانية والمكونة من ٥٩ طالبة الى طريقة تكويد النص المعدلة (تكويد النص يعقبه الكتابة بشكل فردي في مدونات خاصة). واشتملت أدوات البحث على اختبار قبلي لتحديد الكفاءة اللغوية للطلاب اختبارللفهم القرائي من إعداد الباحثة وكذا مقياس الحاجة الى المعرفة. وقد أكدت النتائج

على وجـود تـأثير تفـاعلي بـين الكفـاءة اللغويـة للطـلاب، مـتغير الحاجـة للمعرفـة وطريقـة التدريس المستخدمة على مهارات الفهم القرائي الاستنتاجي، حيـث كـان أداء الطـلاب ذوي الحاجـة المنخفضـة الى المعرفـة والـذين تعرضوا لإسـتراتيجية تكويـد الـنص المعدلـة أفضل مـن أقـرانهم الـذين درسـوا بطريقـة تكويـد الـنص، بينمـا فـاق أداء الطـلاب ذوي الحاجـة المرتفعـة للمعرفة والذين تعرضوا لطريقة تكويد النص أداء اقرانهم الذين درسوا بطريقة تكويد الـنص المعدلة. كمـا لوحظ عدم وجـود تـأثير تفـاعلي بـين المتغيرات الثلاث المشار إليهـا على مهارات الفهم الحريـة للـنص.وتنتهـي الدراسـة إلى خلاصة مفادهـا أهميـة تنويـع المعالجـات التدريسـية بحيث تراعي ﻓ بنائهـا الاسـاليب المعرفيـة المتباينـة للطلاب واختلاف نـواحي القـوة والضعف لديهم.

Introduction

EFL university students- throughout their academic study- are exposed to a myriad of reading texts, which are sometimes beyond their proficiency level. EFL and subject matter teachers, more often than not, work with the false assumption that students possess the necessary cognitive and meta-cognitive strategies to cope with the comprehension difficulties they face, and hence students hardly ever receive the assistance they desperately need (Levine, Ferenz, and Reves, 2000). Inevitably, this view has led students to get used to experiencing comprehension gaps, that they even sometimes accept a distorted comprehension of the text, reflected in their inability to adequately answer questions assessing their deep assimilation of the text content (Ehlers-Zavala, 2005). Thus, unequipped with the necessary meta-cognitive strategies to handle the comprehension process, EFL learners tend to harbor a great deal of negative attitude towards reading comprehension activities (Takallou, 2010).

Students at Kuwait University are no exception Observations, based on classroom assessment and achievement tests, reported by TEFL teaching specialists, in the English language Department, College of Science, attested to the fact that freshman EFL university students encounter considerable problems in comprehending reading materials, particularly at the inferential level. To support this claim, a pilot study was conducted to examine the reading strategies used by a random sample of 20 university students, who were asked to reflect on ideas they were thinking of during reading. Evidence gave some indication that students were unaware of the strategies they have to adopt to facilitate comprehension and that frustration and avoidance of deliberation were the typical behaviors in face of reading difficulties.

Reviewing previous literature, it became quite evident that EFL/ESL students can be induced to use comprehension monitoring

strategies during reading (Brimmer, 2004; Kucan, & Beck, 1997; Ortlieb& Norris, 2012; Smith, 2006). Comprehension monitoring is a dimension of metacognitive competence that facilitates text comprehension at the macro and micro level (Baker & Brown, 1984). It is said to be of paramount importance, especially when figuring out the meaning of expository texts, which, unlike narrative texts, are characterized by being low interest and packed with new terms, sophisticated structures, and unexpected organizational patterns (Gentry, 2006; Smith, 2006 & Van Kraayenoord, 2010).

Nonetheless, the reality of EFL classroom instruction has revealed a noticeable gap in reading performance between those who are achieving as expected, and those who seem uninvolved in the reading act despite being exposed to meta-cognitive monitoring instruction (Ruddell, & Unrau, 2004). This raises questions as to whether other factors, pertinent to the reader himself, might be at play (Vaughn et al., 2011). It also resonates with the call for broadening the definition of reading and the related research agenda so that the role of learners' latent personality traits in facilitating or, otherwise, impeding learning is taken into consideration (Forsten, Grant& Hollas, 2002). This is thought to oppose the one-size-fit-all EFL reading instructional approaches extensively adopted (Tomlinson, 2003).

For instance, even though it has been substantiated that collaborative techniques can provide optimum condition for acquiring comprehension monitoring strategies during reading, there is a counter-argument based on empirical evidence that alludes to the fact that some EFL students cannot respond positively to these techniques (Fan, 2010 & Wang, 2008). In other words, not all students would benefit from instruction based on explicating publicly their strategic thinking, especially with the possibility of incorrect feedback received or insufficient monitoring on the teacher's part (Mckeown & Gentilucci, 2007).

This might warrant considering other individualized techniques to cater for students' different needs. One possibility is the use of the written mode as a self-retrospection technique to report on incorporated reading strategies (Crabtree, Alber-Morgan and

Konrad, 2010). Another alternative worth considering is teacher's feedback. For instance, it is argued that some students can benefit from group- oriented generalized and implicit feedback. On the other hand, others can only achieve progress if exposed to individually-tailored procedural and explicit feedback (Ruddell, & Unrau, 2004).

A crucial learner's characteristic contributing to students' persistence and ability to indulge in deep thinking and hence their response to instructional treatment is the need for cognition (NFC). In this respect, it is claimed that students who possess a higher level of this construct would be able to solve difficult problems and deal effectively with abstract ideas. Alternatively, learners low in NFC are more likely to express difficulties in exerting mental effort and solving problems (Lewin, Huneke, & Jasper, 2000). The choice of this variable, in the current study, was motivated by a burgeoning body of evidence indicating the pivotal role it plays in determining learners' cognitive processing mechanisms, including learning from text and comprehension (Cacioppo, Petty, Feinstein & Jarvis, 1996; Dai and Wang, 2004; Kardash and Noel, 2000). Besides its potential impact on comprehension, the current study is also concerned with how NFC moderates the effect of meta-cognitive monitoring instruction.

Statement of the Problem

Reading instruction currently embraced in the general English language program, College of Science, Kuwait University, is thought, as indicated by the low reading achievement of EFL students, to have fallen short of properly addressing students' reading difficulties and hence improving their comprehension. The study, hence, was intended to identify the extent to which EFL reading comprehension can be enhanced by means of two treatments intended to train students to monitor their comprehension, and if this effect was moderated by their need for cognition and language proficiency. The study, thus, addressed the following main question:

How will the reading comprehension of EFL students categorized according to their need for cognition style and EFL proficiency differ if exposed to two distinct comprehension monitoring instructional treatments?

The following questions were derived from the main question:

- *To what extent will the text coding treatment (TC) followed by retrospective thinking aloud have a significant effect on the literal and inferential reading comprehension of EFL learners categorized as high versus low in NFC?*
- *To what extent will a modified text coding treatment (MTC) -text coding followed by self reflection in reading logs- have a significant effect on the literal and inferential reading comprehension of EFL learners categorized as high versus low in NFC?*
- *What moderating effect does learners' English language proficiency have on the interaction between the treatment and need for cognition (NFC) on literal and inferential comprehension?*

Study Hypotheses

The following hypotheses were tested:
- *There are statistically significant differences between the mean scores of students in both experimental groups on the pre-test and posttest in favor of the posttest in both literal and inferential comprehension.*
- *There is a main effect for the treatment; that is there are statistically significant differences between both groups on the posttest in literal and inferential comprehension*
- *There is a main effect for EFL proficiency; that is there are statistically significant differences between low and intermediate language proficiency students on the posttest in literal and inferential comprehension.*
- *There is a main effect for the learners' need for cognition; that is there are statistically significant differences between low and high in NFC students on the posttest in both literal and inferential comprehension*
- *There is an interaction between need for cognition and treatment; that is, the effect of the NFC is not the same for both experimental groups at the literal and inferential levels.*
- *There is an interaction between language proficiency and treatment; that is, the effect of language proficiency is not the same for both groups at the literal and inferential levels.*
- *There is an interaction between need for cognition, language proficiency and treatment. That is the effect of the treatment is moderated by both NFC and language proficiency at the literal and inferential levels.*

Purpose of the Study

The purpose of this study was to investigate the interaction between specific EFL learner's characteristics and two instructional methods for teaching comprehension meta-cognitive monitoring which vary in the degree of reciprocity among learners, mode of self reflection and quality of teacher's feedback. Specifically, the current study examined: a) the effect of text coding (TC) and modified text coding (MTC) on promoting EFL intermediate students' reading comprehension, and b) whether an interaction exists between type of instruction, learners' need for cognition and language proficiency.

Significance of the Study:

The study extends the research on teaching meta-cognitive strategies to improve EFL reading comprehension. Considerably, meta-cognitive comprehension monitoring strategies have not received considerable attention in the EFL domain and almost all previous studies were restricted to using the thinking aloud technique and collaborative strategies. However, the current study gave due consideration to the fact that students with different personal characteristics might not respond similarly to the same method. On that account, it is hoped that this study will enable teachers and curriculum designers to consider EFL students' latent characteristics when designing activities targeting their comprehension monitoring strategies at the word, sentence and text level.

Delimitations of the Study

This study was confined to:

- Two levels of reading comprehension (literal and inferential); critical reading was not tackled in the current study.
- A sample of 121 first year university students, College of Science, Kuwait University.
- Two learners' characteristics namely need for cognition (NFC) and EFL proficiency.
- A limited duration for implementing the treatment (one semester, i.e., nearly four months).

Definition of Terms

Meta-cognitive -monitoring

It is the reader's ability to check understanding of the written text and his attempts to apply various comprehension repair elements to fix-up comprehension problems (Hedin, 2008, p. 26).

Need for cognition (NFC)

In the context of reading, it is defined as a reader's tendency to engage in deep understanding of a text and enjoy the processes and outcomes of the comprehension activity (Dai & Wang, 2007, p. 5). In the current study, it is measured by students' scores on the Need for Cognition scale.

A moderating variable

A moderator is a variable that alters the direction or strength of the relationship between an independent variable and a dependent variable (Baron & Kenny, 1986). In the current study, both NFC and language proficiency are dealt with as moderating variables between the instructional method (independent variable) and literal and inferential comprehension (dependent variables).

Reading comprehension

It is defined as the score on both the literal and inferential sections of the reading comprehension test designed for that purpose.

Review of Related Literature

(Meta-cognitive Monitoring Instruction & Need for Cognition)

In this section, background on the concept of meta-cognitive comprehension monitoring is provided and its linkage to effective reading comprehension is emphasized. Two conceptualizations of meta-cognitive monitoring instruction are discussed to unveil an important distinction between the limited concept of monitoring strategy use and the more comprehensive concept of monitoring comprehension, with a particular emphasis on text coding as a means of developing comprehension monitoring. This section, also, casts light on Need for Cognition (NFC) as a cognitive variable that might facilitate or hinder reading comprehension on the one hand and as a moderating variable that might interact with meta-cognitive monitoring instruction on the other hand. The section ends up with describing the two suggested text coding instructional strategies and demonstrates aspects of compatibility to need for cognition (NFC) styles.

Meta-cognitive Monitoring

It has widely been argued that there is a strong connection between successful comprehension and meta-cognitive strategic competence (Baker & Brown, 1984). Meta-cognitive strategies subsume two harmonious constructs: awareness of one's cognitive process and

self-regulation (Georghiades, 2004). Self-regulation implies planning or setting goals prior to reading and monitoring comprehension; monitoring, in turn, comprises a comprehension repair element that enables the reader to fix-up or "debug" comprehension problems at the micro level (syntactic structure, cohesion, and pronoun referents…etc.) and macro level (incongruence with reader's schemata) (Baumann, Jones, & Seifert-Kessell, 1992, p. 145; Hedin, 2008, p. 27).

Yang (2006, p. 313), draws a distinction between monitoring and fix-up strategies. In his viewpoint, fix up strategies comprise all cognitive reading strategies (skimming, scanning, using contextual clues…etc.) that facilitate understanding of the text surface meaning. On the other hand, monitoring is exclusively an evaluative tool, or a super-ordinate strategic mechanism, that assesses the efficacy of the comprehension process, and, in case of breakdown, manipulates fix-up strategies to figure out the text deep meaning.

However, in many instances, especially in EFL contexts, monitoring is not activated because, as Otero (2002) hypothesizes, each reader has a minimal acceptance level (MAL) at which he/she will never notice lack of comprehension. Sometimes, the inactivation is due to faulty comprehension of the author's real intent (Baker and Brown, 1984).This implies that unless comprehension failure impedes goal realization, monitoring remains an idle facility rarely capitalized on. This is compounded by the fact that comprehension monitoring is a covert process which is impossible to reveal, especially if the text is below the reader's level (Hedin, 2008, 27). Therefore, the need emerges to adopt mechanisms that help to unveil hidden cognitive processes to alter EFL learners' misguided strategy use (Mastropieri & Scruggs, 1997).

Recently, theories of comprehension meta-cognitive monitoring instruction have been substantially informed by the dual coding theory of comprehension (DCT). Unlike the schema theory, which assumes the existence of a solely amodal abstract code in the form of verbally structured background knowledge to interpret comprehension (Sadoski & Paivio, 2001), the DCT can be considered more comprehensive as it emphasizes, also, non-verbal aspects underpinning comprehension, such as mental imagery, affective reaction and sensory experiences (Ehlers-Zavala, 2005; Paivio, & Lambert, 1981).

One implication of this theory is the efficiency of responding visually to a text either by means of drawing or using words to create mental images of the text content (Sadoski & Paivio, 2001; Steffensen, Goetz &Cheng, 1999). Through visualization, students are enabled to gain a full, or deeper, understanding of the text, self-monitor comprehension and make inferences (Bell, 2004; Harvey & Goudvis, 2007). Another implication is the potential impact of eliciting students' affective response to textual material (Steffensen et al., 1999). This emotional response is claimed to at the heart of the reading process as it strongly bears upon students' decision to read (Ehlers-Zavala, 2005).

Strategy Monitoring versus Comprehension Monitoring

Reviewing previous literature on comprehension monitoring instruction, two research trends can obviously be discerned. The first conceptualizes monitoring as a self-regulatory mechanism to ensure the correct application of a newly learned strategy, or set of strategies. The second trend, on the other hand, which is more comprehensive and reflective of authentic reading situations, perceives of comprehension monitoring as the reader's ability to check the success or failure of text understanding in its entirety, utilizing whatever strategies are available in his/her repertoire.

Supporting the first trend, some studies were focused on using comprehension monitoring to train students to extract the main idea, mainly in English as a first language. For example, Graves and Levin (1989) investigated the effect of direct instruction, direct instruction plus monitoring, and direct instruction plus mnemonic to teach main idea strategy to students with disability in grade 5-8. Results showed that the monitoring strategy was most effective for identifying main ideas. In a subsequent study, Jitendra, Hoppes & Xin (2000) indicated the effectiveness of a main idea strategy accompanied by monitoring instruction for improving comprehension of middle school students with disability.

Targeting summarization strategy, Malone and Mastropieri (1992) concluded that middle school students who received summarization plus self- monitoring training outperformed those who received summarization training only on a recall measure.

Crabtree et al., (2010) concluded that a self-monitoring intervention requiring high school students with learning disabilities to record the answers to five questions focusing on story elements could improve their reading comprehension. Considerably, the self-monitoring sheet used by Crabtree et al. is just a story grammar diagram, and thus it can hardly be considered a self-monitoring strategy assessing students' overall textual understanding and comprehension repair strategies.

Perhaps the most serious disadvantage of all previous studies is their restricted approach, which confines comprehension monitoring to a set of self-questioning activities to make sure a certain learned strategy was applied correctly. A more adequate approach is that endorsed by Coté, Goldman and Saul (1998) who argue that comprehension monitoring is a broad concept that increases with the text difficulty and is centered on evaluating the comprehension processes as a whole. During comprehension monitoring instruction, teachers should engage in an ongoing process of decision making reactive to students' needs and aiming at reinforcing their "self-regulatory" processes (Hedin, 2008, p. 13). Some teaching strategies were suggested in literature that adopt this holistic perspective of comprehension monitoring. These include, among others: (a) collaborative strategic reading, (b) KWL, (c) text coding, (d) Reciprocal teaching, (e) Thinking Aloud (Dhieb-Henia, 2003; Philip, & Kim Hua, 2006; Yang, 2006). For the purpose of the current study, the next section will focus mainly on text coding and will shed light on two distinct activities that can be used subsequent to text coding to develop comprehension monitoring: thinking aloud and reading logs.

Text coding

Text coding is an activity that sustains comprehension monitoring strategies. It implies making "notes" to reflect on the inner thinking processing during reading, using a set of symbols put in the margin of the text to help learners keep track of their thinking, and, hence, monitor their understanding (Harvey& Goudvis, 2007; Mahecha, Urrego, & Lozano, 2011). The selection of text coding symbols is based on the purpose of reading comprehension instruction. For instance, adopting the dual coding theory entails using symbols that

elicit students' verbal and non-verbal mental representations to prove comprehension of the text. From another perspective, a meta-cognitive perspective of comprehension necessitates utilizing symbols signaling the reader's comprehension or lack of it.

Subsequent to text coding, students typically use retrospective thinking aloud or self-explanation to express, either to the teacher or to a partner, not only the meaning they could extract but also the thinking processes incorporated to form a mental representation of the text (McNamara, 2004 and Wilhelm, 2001). This is different from concurrent think-alouds in which students are asked to say out loud what they are thinking of during the actual process of reading (Yoshida, 2008). As students retrospectively think out aloud, they figure out how to solve difficulties and reconsider their initial understanding of textual materials so that they can gradually develop into reflective, meta-cognitive, independent learners. This is facilitated by observing others' thinking process during reciprocal thinking aloud sessions.

The effectiveness of thinking aloud in developing ESL/EFL learners' reading comprehension has been empirically substantiated; however, most previous studies focused on concurrent, rather than retrospective thinking aloud. For instance, Baumann et al. (1992) compared three methods: thinking aloud (TA), directed –Reading-thinking activity (DRTA) and a directed reading activity (DRA) on elementary students' reading comprehension. Results of the study proved the TA group outperformed the DRA and DRTA groups.

Brimmer (2004) compared the thinking aloud procedures of monitoring comprehension to using text structure. Results indicated that although there were no significant differences in reading comprehension, students in the think-aloud group had a greater awareness of comprehension monitoring strategies.

Mckeown and Gentilucci, (2007) showed that only intermediate language proficiency students exhibited benefits from using the thinking aloud strategy. It was concluded that no single reading strategy may exist that will improve comprehension for all EFL learners.

The use of thinking aloud can also be incorporated to make a gradual transition from teacher's control to students' independent use

of reading strategies. One technique claiming to make this smooth transition is the self-instructional training (Jitendra et al., 2000, 127). The methodology usually involves rehearsal of strategies-through overt thinking aloud- to help students' practice self-monitoring, and fading procedures to smoothly make the transition from overt to covert self-instruction (Chan, 1991).

Nevertheless, it is argued that while reciprocal self-explanation, or thinking aloud, may help to distribute the cognitive load of constructing meaning during reading, there is some doubt as to whether such collaborative experiences can lead to independent reading comprehension progress for all learners (Pontecorvo, 1993, p. 397). Correspondingly, a trend that sustains the view that EFL readers should go through a great deal of private mental processing, akin to those experienced during authentic silent reading settings, has emerged (Allen & Hancock, 2008).

Thus, instead of reciprocal thinking aloud, ESL reading researchers have suggested that writing can provide students with a more powerful tool to enhance text comprehension by allowing ESL readers to express their understanding of and connection to a text (Kasper, 1996, p. 25). One technique incorporated into reading programs to encourage students' written self- reflection is reading logs (Lay, 1995). Principally, a student's recorded responses on the reading logs allow the teacher the chance to monitor his/her reading, check on his comprehension and discuss what he is reading. This monitoring on the teacher's part can be carried out through a teacher-student conference conducted subsequent to collecting students' written reflections (Lay, 1995).

However, unfortunately, research in this respect has only focused on fostering extensive reading. What is elicited via reading logs is mainly the product of the reading process; no emphasis is laid on the comprehension process students go through to construct a mental representation of the text (Kasper, 1996). In other words, no attempts were made to use reading logs to sustain students' intensive reading and deep comprehension of a text by helping them track and reflect on their use of meta-cognitive strategies.

Taken the preceding considerations into account, in the current study, two versions of text coding were embraced. The two versions had some characteristics in common. First, an explicit and procedural approach was endorsed for scaffolding comprehension monitoring strategies. Moreover, both text coding versions comprised three stages for teaching comprehension monitoring strategies: cognitive modeling, guided practice and independent practice. Both versions were meant to train students on multi-modal strategies for confirming comprehension, i.e., paraphrasing, visualizing, making connection, showing disagreement, expressing emotional response and raising questions, as well as fix up strategies, i.e., word/sentence attack strategies, backtracking/ reading on, making inferences, activating schemata and recognizing text structure.

Nonetheless, in the first instructional strategy (henceforth referred to as text coding "TC"), students had to code the text individually. This was followed by reciprocal retrospective thinking aloud; students worked in pairs or groups and spoke out what went in in their minds while reading the text (Mahecha et al., 2011). During this retrospection, students had to solve problems and reconsider their initial interpretations of the text content.

On the other hand, in the second strategy (henceforth referred to as modified text coding "MTC"), instead of thinking aloud, students were instructed to write down self-statements in reading logs, pertinent to the codes utilized, to retrospectively reflect on their reading and practice strategic thinking (Walker, 2005, p. 690). It was thought that written self-reflection as such would provide a permanent, tangible and even revisable record of students' strategic thinking. Another step that was added to the text coding strategy was student-teacher conferencing, which comprised teacher's revision, correction, individualized discussion of each student's comprehension monitoring log. This additional step was meant to unveil learners' hidden mistakenly used strategies, so tailored strategy-oriented scaffolding could be provided accordingly.

A comparison of the text coding strategy (TC) and the modified text coding strategy (MTC), adopted in the present study, is displayed in figure 1:
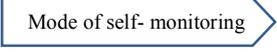
Less directivity	More directivity

Text coding (TC)	Modified Text Coding (MTC)
Instructional method	Modeling+ guided practice+ independent practice-
-High (thinking aloud in groups during training and during independent practice). Reciprocity	-Low (working alone during training and independent practice).
-Oral (retrospective thinking aloud) Mode of self- monitoring	-Written (retrospective self reflection in reading logs)
-Limited to commenting orally on utilized text codes. Retrospection	-Ample chance for retrospection and revision
-Sporadic, product-oriented, directed to the whole group. Teacher's feedback	-Individualized, process- oriented aiming at adjusting faulty strategic mechanisms.

Fgure 1: A comparison of TC & MTC Strategies

Need for Cognition (NFC)

Need for Cognition (NFC) belongs to the theory of intrinsic motivation and mainly emphasizes individual differences regarding degree of enjoyment, or otherwise, of cognitive effort (Cacioppo et al., 1996). Although, NFC has been shown to affect people's cognitive engagement and processing in many ways, Cacioppo et al. (1996) have provided evidence that NFC could be distinguished from general intellectual ability.

Generally, it was found that individuals high in NFC are inclined to search for more information when making decisions and enjoy more effortful cognitive tasks. In contrast, individuals low in NFC are reluctant to indulge in effortful thinking and are more likely to experience their world with second-hand information (Cacioppo et al., 1996, p.198; Sadowski & Gulgoz, 1996, p.303). In the context of reading, NFC is expressed, according to Dai and Wang (2007, 5), as

a "reader's tendency to enjoy the processes of the cognitively demanding comprehension activity"; this tendency is said to facilitate schemata activation, and constructing mental representations compatible with existing background knowledge.

In a nutshell, learners high in NFC are characterized by:
- A high motivation to indulge in effortful thinking, and use of evidence to form opinions.
- A deep approach to understanding.
- Strategic flexibility and ability to explicitly process information.
- Tendency to reasonably seek advice in task related issues.
- Effective analysis of task difficulty and ability to predict their performance accurately.
- Inclination to follow instructions to reflect upon their performance.

On the other hand, learners low in NFC are characterized by:
- A high level of mental effort avoidance and lack of ability to spend time thinking about a task.
- A surface approach to comprehension instead of delving deeply to make sense of a text real message.
- Lack of awareness of strategies to be used in processing information
- Ineffective analysis of task difficulty and failure to predict own performance accurately.
- Overreliance on others as a source of information.
- Inability to follow instructions to reflect upon their performance.

(Evans; Kirby, & Fabrigar, 2003; Radler, 2000; Sadowski, & Gulgoz, 1996; Vanhorn, 1994, ; Woo, Harms, & Kuncel, 2007)

With this in mind, the construct need for cognition (NFC) works as a latent attitudinal factor that disposes the reader to seek information and enjoy meaning construction and hence achieve higher level of comprehension (Evans et al., 2003& Kardash, & Noel, 2000). However, it is still not well known how NFC might dispose learners to respond to various instructional strategies addressing their reading comprehension in general and meta-cognitive monitoring strategies in specific (Woo et al. , 2007).

Therefore, in the current study, since high NFC Learners are inherently deliberative and strategic, it is expected that the achievement motivation of these learners will be high under the (TC)

instruction. From another perspective, low in NFC learners are expected to be well disposed to respond to a tightly controlled instructional milieu such as that supported by the modified text coding (MTC) treatment. An illustration of compatibility aspects between both suggested instructional methods and need for cognition styles are indicated in appendix (III).

Conclusion

Teaching meta-cognitive comprehension monitoring can have a facilitative effect on reading comprehension. Although several studies have been conducted in the field of reading comprehension strategies and meta-cognitive strategies, the distinction between both is noticeably blurred in literature. Furthermore, most of the studies, claiming to promote meta-cognitive monitoring, could not employ a reactive approach to reading comprehension; instead, they predominantly drew on a set of rigid prescribed strategies and checked on students' ability to monitor whether they embraced these strategies, even if comprehension was going on properly. Inevitably, this can lead to the loss of successful strategies the students already possess (Cameron, 2009). Noticeably also, a few studies tackled fix up strategies, in depth, and they mostly addressed word attack strategies.

Furthermore, research has provided evidence of the impact of students' personal variables on their ability to learn, process information and react to instructional intervention. However, no experimental research could be found that examined how EFL students of different personal variables would react to instruction addressing their meta-cognitive strategies; hence, practitioners have been relying mostly on intuition or experience when deciding to assign students to diversified methods or treatments.

As such, the current study made an attempt to explore the distinctive effect of two instructional treatments meant to induce comprehension meta-cognitive monitoring on the reading comprehension of EFL students classified according to their NFC style and investigated if language proficiency would moderate this effect. Generally, the study explored the effect of the text coding (TC) technique. Notably, hardly any experimental studies can be found that investigated the effect of text coding on enhancing EFL learners' reading comprehension. In the current study, thus, two versions of text

coding were investigated. The first adopted the conventional form of text coding, which is typically followed by reciprocal retrospective thinking aloud. The second version, however, utilized individualized written self reflection in the form of reading logs, as a follow-up activity to text coding.

Methodology

Design of the Study

The study is quantitative in nature, adopting a quasi –experimental design involving two treatment groups. The dependent variables were students' literal and inferential reading comprehension. The independent variables were instruction in either TC or MTC treatment, students' need for cognition (NFC), and language proficiency as determined by the language placement test.

Sample

121 EFL first year university female students, enrolled at Kuwait University, College of Science, comprising four intact classes were chosen as the sample of the current study. Two classes of 62 students (30 in the first class and 32 in the second class) were exposed to the (MTC) treatment, whereas the other two classes of 59 students (28 in the first class and 31 in the second class) were exposed to the (TC) treatment. The participants were taking a fall intermediate intensive course offered by the English language Department called 090, which aimed at enhancing their general English language proficiency prior to pursuing university study. The course is taught daily for 120 minutes over a period of 4 months. The reading course is intended to develop students' comprehension and self-study skills to deal with expository texts on various life and academic topics.

Students were aged between 18 and 20 and had been learning EFL in Kuwaiti schools for 12 years. Thus, the participants could be considered a fairly homogenous group in terms of their learning history and language proficiency. Furthermore, results of the one way ANOVA revealed that there were no statistically significant differences between the mean scores of the subjects, in both groups, on the placement test as well as on the reading comprehension test prior to the treatment.

The researcher taught both groups to reduce the possibility of interaction between the treatment and instructor resulting from having different teachers. Both groups read the same expository text

materials included in their reading text book (Q: Skills for Success 2, Reading and Writing) (Craven, Sherman, & Zimmerman, 2010) and approximately equal time was allotted to strategy coaching and independent practice.

Instrumentation

An English language placement test

. At the first phase, a placement test was administered to both study groups. The test is a main component in the prescribed syllabus "Q: Skills for Success 2, Reading and Writing". The test consisted of four sections: a grammar section (11 items), a vocabulary section (21 items), and a reading comprehension section (18 items). The purpose of the test was twofold: first, to make sure that the two groups were homogenous in terms of their language proficiency prior to treatment; second, to categorize students, in both groups, to those of low or intermediate English language proficiency.

To measure the test validity, it was submitted to five TEFL specialists who confirmed its suitability to students' level and study purpose. The test was also piloted on a group of 13 students similar to the target study sample. Internal consistency was measured using KR-20, and a reliability of 0.78 was attained. The test was scored by the researcher out of 50 and the median split method was used to classify students to relatively low versus intermediate in language proficiency (See appendix).

A reading comprehension test

. A pre-post reading comprehension test was developed by the researcher to assess students' comprehension skills. On the whole, the test subsumed two texts (each 450-500 words in length) that have quite the same readability level of the texts included in the students' text book. The test consisted of 40 items assessing literal and inferential comprehension skills, as determined by the university syllabus (See specification below).

To measure the test content validity, the first version was submitted to eight TEFL specialists who approved it in terms of content, length and suitability to students' level. The test was also piloted on a group of 15 university students similar to the study sample. Non-functioning items were removed, and some were modified. In order to establish the test reliability, the test-retest method was used with an interval of two weeks and a reliability coefficient of 0.78 was obtained.

Each item whether multiple choice, true/false or matching was scored as correct (1 point) or incorrect (0 point); each short answer item was scored as either correct (1 point), partially correct (0.5) or incorrect (0 point) (see appendix II). All corrections were carried out by the researcher. The test specification is shown in table 1:

Table 1:The Reading Comprehension Test Specification

Reading comprehension	Reading skills	M.C.Q	Short answer	True/ false	Matching	N. questions	Score
Literal	Getting explicit main ideas.	1-2-3				17	17
	Extracting a specific detail	4-7	15-16-18-36-37-38-39-40	26-28-29-30			
Inferential	Getting inexplicit main ideas				21-22-23-24	23	23
	Inferring specific details	5-6-8	17-19-20-	25-27-31			
	Guessing the meaning of words from context			32-33-34-35	9-10-11-12-13-14		
		8	11	11	10		
Total		40					40

3-The Need for Cognition scale

. Need for cognition (NFC) was measured using the Need for Cognition Scale, developed by Cacioppo and Petty (1982). The 18-item NFC scale measures individuals' responses to a set of situations that require cognitive effort, on a 5-point Likert scale ranging from (extremely uncharacteristic) to (extremely characteristic). Cacioppo and Petty (1982) conducted four studies to develop and validate the NFC scale, and reported adequate reliability, as well as predictive validity of the scale. For the purpose of the current study, the scale was translated to Arabic to eliminate the language barrier (See appendix IV). Subsequently, the scale was submitted to a panel of jury (4 educational psychology specialists) to prove its validity and suitability for the study purpose. The scale was also piloted on a sample of 30 students similar to the study sample to test its cultural validity. Furthermore, Crohnbach Alpha reliability estimate was calculated and a value of .86 was obtained. The median split method was used to categorize students on the scale to those high in NFC and those low in NFC.

Treatment conditions
Instruction followed with both groups

Introducing text coding symbols.
Initially, students, in both groups were given one session, spanning 60 minutes, to introduce the coding chart to be used during reading along with a brief explanation for each code. The codes were as follows:

- ✓ *Signaling understanding (paraphrasing)*
- ∞ *Making connection*
- *? Asking questions*
- *X Disagreement*
- *Affective response*
- *★ Main idea*
- *inferencing*
- *visualizing*
- *Signaling lack of comprehension*

Comprehension monitoring strategies.
Six sessions, comprising seven reading texts, were specified to introduce and scaffold comprehension monitoring strategies. The selection of strategies was mainly grounded in the dual-coding theory and was also derived by research in the domain of meta-cognitive comprehension monitoring strategies. The strategies were divided to those pertinent to signaling comprehension and those used to fix-up comprehension breakdown as follows:

First: Signaling comprehension.

Session (1)
- *Paraphrasing. Students learned how to say in their own words what they have got from a certain section.*
- *Making connection. Students learned how to relate the text either to their life as well as other parts in the text.*

Session (2)
- *Signaling disagreement: Students learned how to mark parts that contradicted what they knew or expected.*
- *Affective response: Students had to report if they felt excited, worried, depressed…etc, with justification from the text supported by previous knowledge.*

- _Extracting the main idea: Students had to explain the main point of the text/paragraph._
- _Asking questions: Students were directed to ask questions about information stated directly or indirectly in the text to fill in a gap or draw inferences._
- _Visualization: students were guided to draw or report the mental pictures they could form in their mind while reading._

Second: Signaling lack of comprehension.

At this part, students were introduced to potential sources of comprehension problems along with corresponding fix-up alternatives. Sessions (4), (5) and (6) covered fix-up strategies:

Session (4)

- _Problems at the word level :Word attack strategies (Skipping, identifying part of speech, guessing from context, and analyzing the word to prefix, root and suffix)._
- _Problems at the sentence level : Sentence attack strategies. Students learned how to divide the sentence into its main parts._

Session (5)

- _Losing the thread of meaning: Backtracking or reading on._
- _A missing piece of information: Raising questions, such as "am I supposed to make an inference or fill a gap in the text?_

Session (6)

- _Not knowing about the topic :Activating background knowledge or search;_
- _Not knowing how the text is organized Identifying the text structure, e.g., problem solution, cause- effect, classification…etc._

.Instructional procedures.

To enable students, in both groups, to grasp and practice the aforementioned strategies, instruction in each session followed a sequence of explicit instruction, cognitive modeling, guided practice and independent practice. Prior to each session, the teacher had to prepare the paragraphs to be read aloud to students to determine statements to verbalize, and strategies to report. English was used as the language of instruction. Explicit instruction of comprehension monitoring strategies was the same for both groups, except for sentence attack strategies and visualization. For sentence attack strategies, the TC group learned how to divide the sentence into its

main parts and identify relationships at the sentence level, while the MTC group was exposed to sentence diagramming, i.e., dividing the sentence to its parts using visual representations (Scott, 2009). The sentence diagram maker, accessed online, was utilized for that purpose:http: //1aiway. Com /nlp4net/services /enparser/).As for visualization, whereas the TC group verbalized the mental pictures they could think of, the MTC described in writing, or through drawing, images they could think of during reading. Cognitive modeling, guided and independent practice were also distinct for both groups as follows:

The text-coding (TC) group.

Training on separate strategies.

- *Cognitive modeling. The teacher displayed the first two or three paragraphs of the text on the overhead projector and read aloud to model text coding using post-it notes and highlighters to mark the text using the symbols in the coding chart. Then, the teacher modeled the monitoring process by thinking aloud at points where codes were marked, so that students could understand how the meaning was being constructed, using the targeted strategies in each session.*

- *Guided practice. Under the teacher's guidance, each student had to individually code the paragraph/text. After that, they had to take turns reading aloud through the text while verbalizing their thinking, to the whole class, at points where codes had been placed. This afforded the teacher the opportunity to monitor students' independent use of the comprehension monitoring strategies. To avoid the problem of limited L2 production abilities and to avoid cognitive processes not in the focus of the study, students were instructed to verbalize in their mother language in case of difficulty. The teacher worked as a monitor and facilitator.*

- *Independent practice. The students had to work in groups of four; each student had to read and code her paragraph/s. Then, students had to retrospectively think aloud, in front of their partners, to explain the thinking processes underpinning the use of each code they had marked. Other students had to provide help or challenge each other's coding and reported strategies. Feedback was directed to the whole group.*

Putting all strategies into practice. Students had to go through six more sessions (comprising 6 reading texts) to practice all comprehension monitoring strategies in tandem. In each session, they were led to work in groups of four and to read silently, code the text, and practice reciprocal retrospective thinking aloud. In each lesson, students in various groups were assigned only two or three paragraphs to facilitate in- depth comprehension monitoring.

Wrap up. Upon analyzing the text within groups, a wrap up phase was assigned to share main ideas among groups, explain incorporated codes, and bridge the gaps in students' strategic processing. The modified text coding (MTC) group. Initially, students were introduced to a two-section self- monitoring reading log designed for recording reflective responses to the text. The same symbols on the text were printed on the log along with spaces for further elaboration. In the first section, students were required to (a) go over the text until they come to a spot that was coded, (b) locate the code on their log and record the paragraph number and line, and c) write the thoughts they had when they placed that code. In the second section, students had to elaborate on utilized fix up strategies. To ensure full comprehension, it was pointed out that each code had to be used at least once throughout the text.

Training on separate strategies.

Cognitive modeling

. The teacher displayed the first two or three paragraphs of the text on the overhead projector and read aloud to model text coding using post-it notes and highlighters to mark the text using the symbols in the coding chart. Then, the teacher modeled the monitoring process by thinking aloud and demonstrating what to write in the reading log at points where codes were marked.

Guided practice.

Utilizing the two subsequent paragraphs or another text, each student had to individually code the text. After that, with the teacher's assistance, they had to record comments pertinent to each code on a reading log. To avoid the problem of limited language proficiency, instructions on the reading log were translated to Arabic. Students were also told that they can write freely without worrying about grammatical or vocabulary mistakes. Feedback and further scaffolding were directed to individual students and later to the whole class.

Independent practice:

Students had to read another text without the teacher's guidance. During reading, they were required to code the text, using the strategies taught in each session, and subsequently record their thoughts on their reading logs, either the evidence that they had understood or means of sorting out miscomprehension. Feedback was provided to individual students.

Putting all strategies into practice.

Students had to go through six more sessions (comprising 6 reading texts) to practice all comprehension monitoring strategies in tandem. In each session, they were led to read silently, code the text, and record their self- reflections in the reading logs.

Teacher-student conference

Upon reviewing each student's reading log, a teacher -student conference was held to praise the student's work, provide feedback and correct inappropriate use of meta-cognitive monitoring strategies resulting in students' faulty comprehension or inability to understand the text in depth. In case of miscomprehension, further scaffolding was provided to help students apply comprehension monitoring strategies effectively. (See appendix V for instructional treatments).

Results

Descriptive analysis, paired samples t-tests, and a factorial 2x2x2 analysis of Covariance (ANCOVA), with the pretest as a covariate was run for this non-orthogonal design to examine the main and the interactional effects of independent variables which are predictors for dependent variables. MANCOVA was not used in the current study because the emphasis was not on the composite of both dependent variables (Huberty, & Morris, 1989); rather, the main focus was to look at each dependent variable to see if the three independent variables have a significant impact on it. The research design can be represented by the following figure:
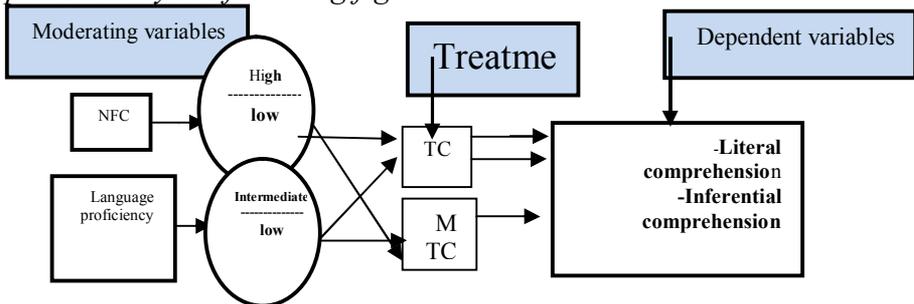

Figure 2. Design of the Study

Distribution of Students

Descriptive analysis showed that the distribution of students on the study groups was as in table (2).

Table 2: Distribution of Students in Treatment Groups

Treatments	Language proficiency	N. high NFC	N. Low NFC	Total/treatment
TC	Low	*14*	*15*	*59*
	intermediate	*15*	*15*	
MTC	Low	*14*	*15*	*62*
	intermediate	*16*	*17*	
Total/ NFC		**59**	**62**	

The study hypotheses dealt with students' language proficiency, need for cognition and comprehension monitoring instruction. Thus, the main effects and interactional effects pertinent to the study purpose were assessed with reference to the hypotheses.

Hypothesis one

There are statistically significant differences between the mean scores of students in both groups on the pre-test and posttest in favor of the posttest in literal and inferential comprehension.To compare the progress students could achieve from the pretest to the post test, paired sample t-tests were applied as shown in table 3

NFC	Proficiency	RC[a]	Pre-test	Post-test	t	Effect size	Pre-test	Post-test	t	Effect size
						MTC				**TC**
			M (SD)	M			M (SD)	M (SD)		
Low	Low F1	Lit[b]	7.1 (2.3)	9.9 (1.8)	10.3*	2.8	7.6 (1.5)	10.2 (2)	11.7*	3.9
	Intermediate		8.7(1.4)	14.1 (2.7	7.7*	2.1	8.8 (1.3)	10.6 (3.1)	2.6*	0.9
	Low	Inf[c]	6.9 (2.1) 2.1	9.6 (1.6) 1	5.8*	1.13	6.2 (1) 2	9.9 (1.3) 2.1	6.9*	2.1
	Intermediate		10.6 (2.1)	15.6 (2.1)	9.3*	2.2	11.6 (3.4)	10.6 (3.5)	0.7	0.2
High	Low	Lit	8.2 (1.2)	13.1(3.1)	8.2*	3.8	6.2 (0.8)	10.2 (2.4)	6.6*	2.3
	Intermediate		10.4 (1.3)	15.6 (2.3)	9.4*	2.6	9.4 (1.3)	12.1 (1.9)	6.2*	1.7
	Low	Inf	5.9 (3)	10.5 (3.6)	8.2*	2.3	5.2 (0.8)	13.7 (2.1)	14.6*	4.3 3
	Intermediate		12.8 (1.9)	16.7 (2.5)	6.5*	1.7	11.4 (4.1)	15.5 (3.3)	4.7*	1.4

Note. The maximum score for literal and inferential comprehension = 20.

RCa refers to reading comprehension, Litbrefers to literal comprehension, Infc refers to inferential comprehension

Clearly, table 3 shows that as far as low in NFC learners' literal comprehension is concerned, there were statistically significant differences between students' mean scores on the pretest and posttest in favor of the posttest in the MTC and TC treatments. Comparing effect sizes, it seemed that low NFC/low proficiency students' performed better under the TC treatment. On the contrary, low NFC/ intermediate performed better under the MTC strategy. Regarding inferential comprehension, there were statistically significant differences between the mean scores of low NFC/low proficiency learners on the pretest and posttest in favor of the posttest in both MTC and TC treatments. However, no statistically significant differences were found between the mean scores on the pretest and posttest of the low NFC/ intermediate proficiency group in the TC treatment, $t=0.7$, $F >0.05$. Comparing effect sizes, apparently low NFC/low proficiency students could achieve better results in the TC treatment. On the contrary, low NFC/ intermediate proficiency students performed better under the MTC treatment.

Regarding high in NFC students' achievement on literal comprehension, there were statistically significant differences between the mean scores of students in the TC and the MTC treatment, on the pretest and posttest in favor of the posttest. Obtained effect sizes show that all high in NFC achieved more progress in the MTC treatment. As far as inferential comprehension is concerned, there were statistically significant differences between students' mean scores on the pretest and posttest in the MTC and TC treatment in favor of the posttest. Comparing effect sizes reveals that high NFC/low language proficiency students achieved better results in the TC treatment. On the contrary, high NFC/ intermediate proficiency students' progress was quite similar in both treatments.

Main Effects

Hypothesis (2), (3) and (4) tackled the main effects of: a) the treatment, b) language proficiency, and c) need for cognition respectively. To verify the study hypotheses, three way ANCOVA (F) tests, with the pretest as covariate were run. Table 4 displays the main effects.

Table 4: *Univaraite Analysis of Covariance: Main effect on Both Dependent Variables*

Source	Dependent Variable	Sum of Squares	df	Mean Squares	F	P	Partial Eta Squared
Treatment	*Literal*	163	1	163	8.3	.005*	.069
	Inferential	12.2	1	12.2	11.7	.001*	.095
proficiency	*Literal*	108.5	1	108.5	18.5	.000*	.141
	Inferential	363.2	1	363.2	9.7	.002*	.064
NFC	*Literal*	44.72	1	44.72	5.7	.018*	.042
	Inferential	200.5	1	200.5	12.6	.001*	.101
Error	Literal	717.1	113	6.3			
	Inferential	793.1	113	7.1			

Table 4 shows that there is a significant univariate main effect for the treatment on literal comprehension (F (1,113) = 8.3, p=.005, partial eta squared=.069, and on inferential comprehension (F (1,113) =11.7, p=0.001, partial eta squared = .095; thus the second hypothesis was accepted. In the same way, there was a univariate main effect for language proficiency on literal comprehension F (1,113) =18.5, p=.000, partial eta squared=.141, and inferential comprehension (F (1, 113)= 9.7, p=.002, partial eta squared=.064. Therefore, the third hypothesis was confirmed. Moreover, there was a univariate main effect for NFC at the literal level (F (1, 113) =5.7, p=.018, partial eta squared=.042, and inferential comprehension (F (1, 113)= 12.6, p= .001, partial eta squared=.101. Thus, the fourth hypothesis was confirmed.

Effects of Interaction

Hypotheses addressing the interaction effects were as follows:

- Hypothesis (5): There is an interaction between NFC and treatment.
- Hypothesis (6): There is an interaction between language proficiency and treatment.
- Hypothesis (7): There is an interaction between NFC, language proficiency and treatment.
- Table 5 shows the univariate ANCOVA tests of the interactional effect on both literal and inferential comprehension

Table 5 :Univaraite Analysis of Covariance: Interactional Effects on Both Variables

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	P	Partial Eta Squared
Treatment * proficiency	*Literal*	1.055	1	1.055	6.4	.012*	.055
	Inferential	111.92	1	111.92	10.06	.002*	.070
Treatment* NFC	*Literal*	8.8	1	8.8	1.28	.369	.007
	Inferential	69.27	1	69.27	7.92	.014*	.053
Treatment * proficiency * NFC	*Literal*	15.4	1	5.4	.800	.373	.007
	Inferential	108.4	1	8.01	5.3	.002*	.046
Error	*Literal*	717.1	113	6.3			
	Inferential	793.1	113	7.1			

As shown in table (5), univariate two- way interactional effect of treatment and language proficiency was found on literal comprehension (F(1, 113)=6.4, p=.012, partial eta squared=0.05, and inferential comprehension (F(1, 113)= 10.06, p=0.002, partial eta squared=.070; thus the fifth hypothesis was accepted. Similarly, a two way interactional effect of treatment and need for cognition was found, but only on inferential comprehension (F (1, 113) =7.9, p=0.014, partial eta squared= 0.53; no two way interaction was found on literal comprehension, (F (1, 113) = 1.28, p=0.36. Thus, the sixth hypothesis was partly confirmed. Noticeably, there was a significant three way interactional effect, at 0.05 level, of NFC, language proficiency and treatment on inferential comprehension, F(1, 113) = 5.3, p= .002, partial eta squared= 0. 046. However, no three way interactional effect at 0.05 level on literal comprehension was found, F (1,113) = 0.800, p=0.373. Thus the seventh hypothesis was partly accepted.

Analyzing interaction

Only interactional effects were further analyzed in the current study; main effects were only explored further when no higher order interaction was found. Since there was only a two-way interaction in terms of literal comprehension between language proficiency and treatment, it was further investigated by comparing the mean scores of students on literal comprehension at each level of language proficiency, using independent samples t-test, as shown in table (6).

Table 6:T-test results comparing low and intermediate proficiency students in both treatments in literal comprehension

Language proficiency	Treatment	N	M	SD	t	Sig (two tailed)
Low	MTC	30	11.8	2.7	1.7	0.08
	TC	28	10.7	2.6		
Intermedia te	MTC	32	14.8	2.3	5.1	0.00
	TC	31	11.3	2.6		

Note: the total score on literal comprehension is 20

As can be seen from table (6), there were no statistically significant differences between the mean scores of low proficiency students in both treatments (t=1.7, F >0.05). This indicates that low proficiency students performed in the same way in both treatments. However, there were statistically significant differences between the mean scores of intermediate proficiency students in both treatments in favor of the MTC group (t=5.1, F<0.05). The two way interaction at the literal level is displayed in the following figure:
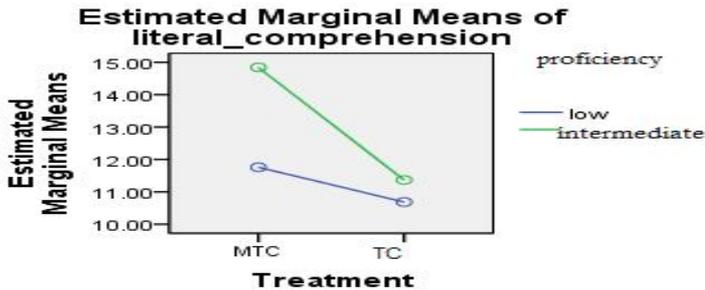
figure 3. Two-Way Interaction of Language proficiency and Treatment at the Literal Level

Noticeably, the NFC had only a main effect regarding literal comprehension, as no interaction was found between this construct and the treatment or language proficiency. The statistically significant differences between high and low in NFC students on the posttest were in favor of high NFC students (M=13) compared to (11.5) for low NFC studentsTurning now to inferential comprehension, since there was a three way interaction of the treatment, language proficiency and NFC, main effects and two-way interactions were not explored further. The three-way interactional effect on inferential comprehension is illustrated in figure (4):
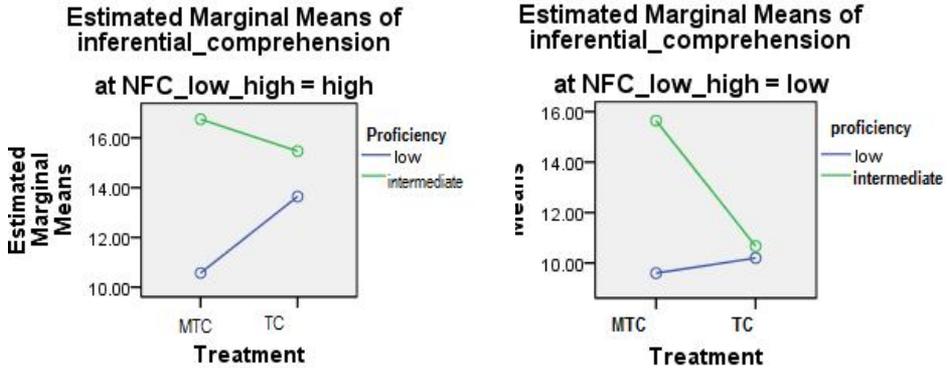
Figure 4. Three- Way Interaction of NFC, proficiency and Treatment at the Inferential Level

Figure (4) shows that, for the high in NFC students, there was an ordinal interaction between treatment and language proficiency. High NFC/ intermediate proficiency students performed quite similarly in both treatments, whereas High NFC /low proficiency students performed better in the TC treatment. On the other hand, regarding low NFC students, there was a disordinal interaction between language proficiency and treatment. Low NFC/ intermediate proficiency students performed better in the MTC treatment, whereas low NFC/low proficiency students performed somewhat better in the TC treatment. The significant interaction was further investigated by evaluating the simple main effects of treatment and language proficiency for both levels of NFC using the one way ANOVA as in table (7).

Table 7:One way ANOVA Comparing High vs. Low in NFC at the Inferential Level

NFC	Proficiency	Treatment	N	M	SD	df	F	P
Low	Low	*MTC*	15	9.6	1.42	1	.38	.54
		TC	15	9.9	1.4	28		
	Intermedia te	*MTC*	17	15.8	2.1	1	24	.00
		TC	15	10.5	2.5	30		
High	Low	*MTC*	14	10.5	3.2	1	7.8	.009
		TC	14	13.7	1.9	26		
	Intermediate	*MTC*	16	16.7	2.5	1	1.8	.18
		TC	15	15.5	3.4	29		

Table (7) shows that there were no statistically significant differences at 0.05 level between the mean scores of low NFC/low proficiency students in inferential comprehension (F (1, 28)=0.0.38, p= 0.54, in both treatments. Nonetheless, there were statistically significant differences at 0.05 level between the mean scores of low NFC/intermediate proficiency students in both treatments in favor of the MTC, (F (1, 30)=24, p=0.00. Notably, also, there were statistically significant differences at 0.05 level between the mean scores of high NFC/ low proficiency students in favor of TC (F(1, 26)=7.8, p=.009. Yet, no statistically significant differences at 0.05 level between the mean scores of high NFC/ intermediate proficiency students in both treatments were found (F (1, 29) =1.8, p=0. 18.

Discussion

By and large, the current quasi- experimental study examined the assumption that students with different levels of NFC process information differently and hence respond differently to instruction addressing their meta-cognitive monitoring strategies. Basically, progress achieved from the pretest to the posttest gave indication that students, in both groups, benefited at the literal and inferential levels, which might be attributed to the increase in their ability to notice problems in understanding and using fix up strategies adaptively and flexibly. Previous studies also found that explicit training on meta-cognitive monitoring strategies can have a remarkable pedagogical impact on students' reading comprehension (Baumann et. al, 1992; Hedin, 2008; Malone & Mastropieri, 1992; Philip &Kim Hua, 2006). The improvement was noticed for all students; yet, low NFC/intermediate proficiency students' performance did not improve much in the TC treatment as regards to inferential comprehension.

Nonetheless, the present study results support the contention that meta-cognitive monitoring instructional strategies are not for everyone in terms of promoting reading comprehension; the effect might differ across various groups categorized according to NFC style. At the literal comprehension level, NFC did not interact with the treatment. That is to say, high and low NFC learners behaved similarly in both treatments. However, language proficiency seemed to have disposed students to interact distinctly to both treatments, i.e., the performance of intermediate- proficiency students exposed to the MTC treatment surpassed their counterparts' performance in the TC treatment. However, low- proficiency students performed similarly in

both treatments. A possible explanation for this might be that that MTC put more demand on students' language ability to cope with the extensive self-reflection element it comprised. For the same reason, low-proficiency students might have found the MTC rather challenging to contend with, and, thus, could not draw much benefit from it.

With regard to inferential comprehension, it is possible to hypothesize that students who are described as low in NFC tended to do better in a highly controlled atmosphere which made up for their tendency to avoid effortful thinking; yet, notably, adequate language proficiency was a prerequisite to drawing benefit from the MTC treatment. This conforms to previous studies alluding to the fact that procedural learning can consolidate low NFC students' achievement (Lewin et al., 2000; Radler, 2000; Sadowski, & Gulgoz, 1996). It appears that the strategic deliberation induced by using writing might have assisted students to deeply internalize effective strategic processing. Furthermore, given their relatively adequate language proficiency, those students could decipher the text surface meaning, and so they could attend well to the self-reflection component, which, in turn, led them to delve more deeply in the text meaning. Teacher-student conferencing, as well, is assumed to have raised students' consciousness of the gaps in their strategic repertoire, and reverse their tendency to overestimate or underestimate the reading task difficulty vis-a-vis their own ability. Realizing that their thinking processes were going to be subjected to teacher's scrutiny, students seemed to have put much effort into applying, revising and assessing their use of the acquired comprehension monitoring strategies.

With the same token, low NFC/intermediate proficiency students might have viewed reciprocal retrospective thinking aloud provided by the TC treatment as overwhelming, and chaotic, yet undemanding with the great weight placed on collective, rather than individual, responsibility, and so they tended to resort to their latent tendency of cognitive effort avoidance and over- reliance on peers which might more or less jeopardized their long-term strategic progress. On the other hand, although low NFC/low proficiency students did not exhibit a remarkable progress in either treatment, it is difficult to explain the slight improvement they could achieve under TC

instruction unless we consider the impact of code switching, typically resorted to during pair or group work, in facilitating comprehension strategies acquisition and alleviating stress.

On the other hand, the study suggests that students described as high NFC/low language proficiency seemed to have benefited from a less controlled milieu where the oral medium of reflecting on the comprehension process was utilized. Furthermore, given their low language ability along with their tendency to seek assistance properly, students might have used their peers' mediated instruction to their advantage, without jeopardizing their individual progress. This was supported by previous research, such as Lewin et al. (2000), Sadowski and Gulgoz (1996) and Vanhorn (1994) who argue that learners high in NFC, unlike those low in NEC, do not show the motivational deficit that usually results from shared responsibility. Certainty, this was not the case with the MTC treatment, with the high demand it placed on students' linguistic ability and the highly procedural teacher's guidance that appeared at odds with students' strategic nature.

The same can be said about high NFC/ intermediate language proficiency students who may have perceived the closely controlled milieu supported by the MTC treatment as redundant, and so their performance in the MTC treatment did not surpass their counterparts in the TC treatment at the inferential level. Yet, due to their relatively adequate language ability, it appeared that those students could perform quite well whether or not the instructional method conformed to their NFC style.

Conclusion

The current findings may add substantially to our understanding of how EFL students respond to instruction addressing their meta-cognitive monitoring strategies. In effect, the interaction found between language proficiency, need for cognition and treatment might be considered encouraging, especially in light of the few such interactions found in meta-cognitive strategy instruction research. Overall, the study results would support the contention that different reading meta-cognitive monitoring instructional methods have different functions in facilitating students' reading comprehension. Although it is always argued that teaching methods should conform to learners' style, it might be assumed, according to the study findings,

that being confronted with teaching methods dissonant to a learner's typical processing style may result in greater cognitive effort and thereby can bridge the gaps in their strategic repertoire.

Particularly, the current study supports the contention that peer-mediated instruction, in the form of reciprocal thinking aloud, embraced by the TC treatment, though effective for most learners, might not be as useful for low in NFC who might be in need for extra scaffolding to counterbalance their cognitive passivity and low cognitive motivation. At the inferential comprehension level, it might be the case that the use of reading logs, as well as the constructive strategy-oriented feedback might have helped to alter those students' ill-advised strategic decisions and resisted their inherent urge to passively rely on others as mediators or facilitators of text comprehension. Yet, interestingly, this was not the case with low NFC /low proficiency students, whose inadequate language ability acted as a hindrance to fulfilling tangible improvement in both treatments. Accordingly, the current study corroborates Yang' (2006) and Imtiaz's (2004) claims, that equipping students with basic language knowledge is vital before planning to train them on using reading comprehension strategies. Alternatively, it might be supposed that students, high in NFC, yet low in language proficiency, can learn well in the TC strategy with retrospective thinking aloud as the sole means for strategy oriented self-reflection. In addition, based on these results, it might be assumed that learners with a relatively adequate language ability coupled with high NFC are more capable of adapting to various instructional contexts.

The current study findings suggest several courses of action. First, TEFL staff in charge of curriculum development as well as teachers will have to pre-assess their students' Need for cognition so that they would be able to ensure that students' learning strengths and deficiencies are properly addressed. It can be suggested that low in NFC students would benefit from incorporating reading logs as a means of reflecting on their strategy use. On the other hand, students high in NFC would benefit more from reciprocal retrospective thinking aloud in enhancing their comprehension monitoring ability. Substantially, also, it stands to reason that, in order to address students' needs, instructors are advised to incorporate remedial strategy-oriented lessons to ensure that students, especially those low in NFC, have reaped benefit by intensively consolidating their

comprehension monitoring strategies. Grouping students homogenously in terms of their need for cognition style can also facilitate diversification of instruction.

With enhanced EFL reading comprehension achievement as the intended goal, this research will serve as a base for future studies. Thus, instead of investigating the effect of certain methods on EFL students' reading achievement, what is now needed is to carry out research to examine if other learning characteristics such as locus of control, self-efficacy and self-esteem can shape EFL learners' response to comprehension meta-cognitive instruction. Results of such studies will provide precise information as to what kind of students would benefit from which type of instruction. Moreover, a study similar to this study can be carried out on different populations, or other reading comprehension skills, such as critical or creative reading.

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((نموذج اشتراك في مجلة دراسات عربية في التربية وعلم النفس))

سعادة / الأستاذ الدكتور : رئيس تحرير مجلة دراسات عربية في التربية وعلم النفس السلام عليكم ورحمة الله وبركاته وبعد ،،

أرغب الاشتراك في المجلة لمدة : (سنة واحدة ☐)

على أن تصلني نسخ أعداد المجلة على عنواني البريدي الموضح بهذا النموذج.

الاســــــــــم	....
الوظيفـــــــــة	....
جهــــة العمــل	....
الجنسيـــــــــة	....
عنوان المراسلــة	....
البريد الإلكتروني	....
الهاتف/ الفاكس	....

اسم المشترك : ....

التوقيــــــع : ....

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- قيمة الاشتراك السنوي للأفراد بالدول العربية : (٥٠٠ ريالا).
- قيمة الاشتراك للأفراد بباقي دول العالم: (٢٠٠ دولار).
- قيمة الاشتراك للمؤسسات بالدول العربية: (٧٥٠ ريالا).
- قيمة الاشتراك للمؤسسات بباقي دول العالم: (٣٥٠ دولار).
- قيمة الاشتراكات هذه شاملة تكاليف البريد العادي ، ومن يرغب في البريد الممتاز يتحمل الفرق.
- يمكن سداد قيمة الاشتراكات بالجنيه المصري مباشرة لمكتب المجلة بجمهورية مصر العربية، أو بحوالة بنكية باسم رئيس التحرير (أ . د / ماهر إسماعيل صبري)على بنك فيصل الإسلامي المصري فرع بنها رقم الحساب ١٨٥٠٦
- ترسل صورة من قسيمة تحويل الاشتراكات على البريد الإلكتروني لرئيس التحرير
  mahersabry2121@yahoo.com
- يرسل هذا النموذج بعد تعبأة بياناته عبر البريد الإلكتروني لرئيس تحرير المجلة ، أو عبر البريد العادي على عنوان رئيس التحرير الحالي : المدينة المنورة ، جامعة طيبة ، كلية التربية، قسم المناهج وطرق التدريس. أو على عنوان مكتبنا بمصر : ١ش أحمد ماهر متفرع من ش الشعراوي، أتريب ، بنها .