THE IMPACT OF TEXT TYPE AND DIFFICULTY ON METACOMPREHENSION AMONG GRADE STUDENTS

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ABSTRACT

The current experimental study aimed at identifying the effect of text type (scientific or historical) and difficulty level (difficult or easy) and their interaction on student's metacomprehension performance. A sample of 180 10th grade female students enrolled in public schools at Alrusiafah district participated in the study; and they were distributed equally on four groups ((1) easy historical text group, (2) difficult historical text group, (3) easy scientific text group and (4) difficult scientific text group). They completed a metacomprehension pretest, read the texts assigned to them (subjects were not familiar with the texts), and then completed the metacomprehension posttest. Metacomprehension test was adapted from Moore et al. (1997); Anderson (2005) and Schmitt (1990). It included (44) items distributed on (7) dimensions. Validity and reliability of the test were insured. Statistically significant differences were found in the metacomprehension posttest in favor of groups 3 and 4, and in favor of group 4 in overall posttest. Differences are found in the metacomprehension dimensions posttest in favor of groups 3 and 4, and in groups 2 and 4 performances in metacomprehension dimensions posttest.

Keywords: Metacomprehension, Easy text, Difficult text, Historical text, Scientific text, Performance.

Contribution/ Originality

The study documents text type and difficulty impact on high school students, a stage important in Jordanian culture because it prepares students to a stage considered most important before admitting to university, its findings may help educators to focus on students metacomprehension for better achievement and success.

1. INTRODUCTION

There is urgent need to reveal if students recognize that they comprehend what they read i.e. their metacomprehension level, which in turn affects their performance. The need becomes more critical toward the beginning of high school grade levels. This study focused on the 10th grade students where challenges facing them amounts. The purpose of the following review is to provide a synthesis of the literature on metacomprehension performance in light of text type and difficulty.

Metacomprehension is considered a vital dimension of metacognition. It is a constructive process of metacognition processes, where students have to use their abilities to make learning judgments, and where proficient students may predict their learning performance and discover their failure in the process of assimilation, (Anderson, 2005).

Metacomprehension research began in the mid-eighties; and was directed towards its role in actual assimilation, which made it an important topic for research (Brown, 1985). Research results proved that learners of different ages recorded low levels of accuracy in the learning judgments and text assimilation, and that the prevailing belief among some researchers about the reason of learners' assimilation failure is due to low levels of ability or lack of motivation (Ma, 2008). However, some psychologists attribute assimilation failure to the misuse of remedial strategies used while reading texts (York, 2006).

Educators and psychologists mentioned several definitions of metacomprehension; Dunlosky (2010) sees metacomprehension as a structural process in which the learner organizes the learning process and evaluates it, the learner who shows a high level of metacomprehension is able to organize and monitor learning constantly, while a learner of lower levels of metacomprehension may not know if he understands a subject and practices it incorrectly, thereby forming a storage of incorrect knowledge.

Schunk (1995) believes that planning is the main dimension of metacomprehension; it represents the learner's awareness of the goals he seeks to achieve from the learning process. Planning includes preparing a specific and explicit work plan involving the proper educational strategies and time organizing process.

Billingsley and Wildman (1990) point out that metacomprehension in reading involves comprehension monitoring, assessing the reading output in the light of efficiency, recognizing failure in comprehension and the factors causing failure, and text difficulties; lack of text inconsistency, lack of information integration and disorganization.

Harris (1988) confirm that learners having weak metacomprehension skills complete reading texts not knowing what they have assimilated out of them, while their peers having more efficient metacomprehension skills use compensatory strategies when they feel that they are not understanding the text.

In spite of the apparent discrepancy among the previous definitions, there is a common ground between all of them; in terms of awareness of information processes of comprehension, recognizing how a certain text is comprehended and comprehension retention to recognize failure, then to use compensatory strategies to treat the failure. Therefore, self-organized learning plays a vital role in metacomprehension (Osman and Hannafin, 1992)

The current study defines metacomprehension as a set of interacting skills and processes that may not be divided through reading the text, as information processing, awareness of accompanying mental processes, the learners' self-organization of learning, learning monitoring, reviewing the extent of advances or failures in text comprehension, then using compensatory strategies to process comprehension failure. Recent studies (Al-Gharaibeh, 2014) identified a strong correlation between students' metacomprehension and their self-efficacy. Metacognitive skills, including metacomprehension have a significant effect on reading achievement, while cognitive skills do not have a significant effect (Zare-ee, 2007).

Standiford (1984) believes that readers are divided into four main categories in terms of metacomprehension:

1. High comprehension, high metacomprehension readers. These are the readers that have the ability to comprehend and recognize that comprehension is accomplished through monitoring and the use of strategies that facilitate comprehension. In turn these readers form awareness of the understood and less understood texts.

2. Low comprehension, high metacomprehension readers. These are low comprehension readers who recognize the failure in comprehension by assessing the comprehension process activated on read texts. These readers may conduct activities to process facing problems.

3. Low comprehension, low metacomprehension readers. They are law comprehension readers that do not stop while reading to assess the extent of comprehension, and do not monitor reading problems. therefore the reader becomes unable to recognize the reason of failure.

4. High comprehension, low metacomprehension readers. These are the readers that have the ability to recognize the subject and get its meaning but they are not certain whether they have comprehended the text or not.

Collins (1994) believes that metacomprehension reading skills are discussed through written texts, tasks, strategies, and the learners' characteristics. Written texts include ideas, organization, recognizing difficult terms and grammar. The task dimension insures that the learners are aware of the goals that enable them to form the meaning of the text. Thompson and Taymans (1994) believe that there are differences between good and bad readers. Good readers tend to use strategies to process texts such as planning, summarizing, taking notes and self-questioning. Awareness of readers' characteristics involves the cultural background, the degree of interest and the reading efficacy of the learner. Previous studies showed that metacomprehension differs by readers' level; low comprehension readers misunderstand the goals of reading. Swanson and Delapaz (1998) confirm that beginner readers do not stop to assess the extent of comprehension while reading; they also do not examine their reading problems in deep. While independent readers are more experienced than beginners in recognizing the reason of their failure in comprehending what they read, i.e. they employ reading strategies better. Brozo, Curtis & Univ (cited in Brown (1985)) mentioned that good comprehension of a text develops a vision of the text by the reader and enables him to analyze, restructure and draw a brief overview about the text that is subject to continuous monitoring and assessing. The text type, readability and difficulty level play a vital role in determining the degree of metacomprehension through reading. The text type is determined by the style of writing. It is found that the narrative texts facilitate metacomprehension more than scientific (Strain, 1976). In this respect Zabrucky and Moore (1999) and York (2006) showed that explanatory and scientific texts require more attention, and deeper processing, while narrative texts allow the reader to reach relevant information by prediction. Readability is determined by the ease of content, density of ideas, and readers' knowledge of the meanings of words. The relationship between the readers' glossary and the level of readability comprehension is very strong. The comprehension level of the text depends on the readers' storage of words and ability to derive meanings out of the text and to turn meanings into meaningful experiences (Strain, 1976). As for text difficulty, Weaver and Bryant (1995) found that text of medium difficulty produces higher accuracy of metacomprehension compared with difficult and easy texts. They proposed the hypothesis of optimal effort; it predicts that metacomprehension accuracy is higher when text level of easiness or difficulty is matched with readers' ability levels. They hypothesized that reading levels of students are related to medium text difficulty. Easy texts were lower than readers levels and difficult texts higher.

Moore *et al*. (2005) and Gier *et al*. (2009) reinforced that manipulation of text difficulty does not affect metacomprehension accuracy in easy and difficult texts, while it is more accurate in texts of medium difficulty. This involves student's focus attention on non-relevant information in both easy and difficult texts.

In this respect some researchers took interest in studying the effect of text type and difficulty on metacomprehension. Pace (1979) studied learners' cognition of two types of words: easy familiar words and difficult unfamiliar words, and metacomprehension abilities. The sample consisted of (80) students, who were provided with four narrative texts, two of which had easy familiar words and the other two contained difficult unfamiliar words. The results revealed no statistical difference in metacomprehension of the texts with easy familiar words, but difficult unfamiliar words had a statistical difference on metacomprehension. Zabrucky and Moore (1999) conducted a study to examine young and old people ability on metacomprehension, by organization and assessment processes of comprehension of narrative and explanatory texts. The sample consisted of (40) participants, who were provided with four narrative and four explanatory texts, each including four paragraphs. The participants were tested individually, and completed metacomprehension test. Results revealed statistical significant differences in metacomprehension in favor of explanatory texts. Lin *et al*. (2000) conducted a study entitled "Metacomprehension: knowledge and comprehension of expository and narrative texts among younger and older adults". The sample consisted of (120) participants, who were provided with several narrative and explanatory texts, each text including four paragraphs. Subjects were told to read according to their reading speed. When they finished, they completed the metacomprehension test. The results indicated no statistical difference in metacomprehension for the narrative

texts, but revealed statistical differences in metacomprehension of the explanatory texts compared with narrative texts in favour of the younger participants.

York (2006) conducted a study entitled "An exploration of the relationship between metacomprehension strategy awareness and reading comprehension performance with narrative and science texts". The study consisted of (132) students, who were provided with a narrative and scientific texts. They were told to read the texts, then answer the questions following them. Results revealed no statistical differences in terms of awareness of metacomprehension due to the text type (narrative or science). De Beni *et al.* (2007) conducted a study entitled "Reading comprehension in aging: the role of working memory and metacomprehension".

The study consisted of (90) participants, who were provided with a narrative text about teenage and an explanatory are about cartoons in Japan. A metacomprehension test was administered after they finished reading. Results revealed no statistically significant difference on metacomprehension of narrative texts, but statistically significant difference was found in metacomprehension of explanatory texts in favour of the young participants group. McGinnis *et al.* (2007) conducted a study to determine the extent of comprehending a narrative text and an explanatory text. The meanings of the two texts were manipulated; familiar words were replaced by unfamiliar words to examine the effect of such a manipulation on metacomprehension in both texts. Participants were told to read the texts, then complete a metacomprehension test. Results revealed a statistically significant difference in metacomprehension of narrative, unfamiliar words text compared with explanatory, unfamiliar words text. Linderholm *et al.* (2008) study examined the affecting factors on metacomprehension. Sixty students completed a predictive pretest about their comprehension on a set of texts (narrative, explanatory and newspaper articles).

The students read the texts and completed a metacomprehension test. Results revealed a statistical significant difference in metacomprehension in favor of the narrative texts compared with other texts. An overview on the previous literature on the effect of text type on metacomprehension yielded: The results of the previous studies contradicted. Few studies revealed that metacomprehension is better for explanatory texts as in Zabrucky and Moore (1999); Lin *et al.* (2000); De Beni *et al.* (2007) while other studies revealed that metacomprehension is better in narrative texts as in Linderholm *et al.* (2008). Others indicated no statistically significant difference on metacomprehension due to text type as in Pierce and Smith (2001); York (2006) while others showed statistical significant differences of metacomprehension for narrative texts including difficult unfamiliar words as in Pace (1979) & McGinnis *et al.* (2007). Based on the previous literature the researchers assume a relationship between text type and difficulty on the on hand and metacomprehension on the other.

A gap arises in Arab and local literature on this subject, the current study will try to bridge this gap, and explore the effect of text type and difficulty in metacomprehension on a sample of school students.

1.1. Study Problem

Good metacomprehension abilities are considered an important factor of success in learning courses, while weak metacomprehension abilities threaten academic achievement, weaken intellectual storage, and may lead to failure in school life, especially among high school students, where students rely in their learning on metacomprehension more than comprehension, students with metacomprehension skills learn language easier than the ones with weaker skills. Although metacomprehension is important in the development of learning processes, teachers are usually unaware of the factors affecting metacomprehension of reading texts, such as readability, writing style and level of difficulty. Not informing students of metacomprehension skills wastes time and teachers' efforts and affects the level of learning. Metacomprehension is considered a main objective that guides students to become more efficient in learning, by teaching them the ways of controlling and monitoring their learning processes. Accordingly, the current study tried to answer the following question:

Are there statistical differences at ($\alpha=0.05$) between the means of the subjects metacomprehension due to text type, text difficulty or to their interaction?

1.2. Importance of the Study

The study explores metacomprehension of 10th grade students, a group representing the beginning of high school which requires more ability to deal with written material by having metacomprehension skills. It may also be considered a part of the theoretical and practical literature that emphasizes metacomprehension, it may add new knowledge to the educational thought, and be the core for further studies in future. Lack of Arabic and local studies examining the effect of text type and difficulty on metacomprehension, urged the authors to undertake the current study.

1.3. Procedural Definitions

For the purpose of the study, the following definition is used:

<u>Metacomprehension</u> is the learners' ability to monitor and organize his learning and detect failure in text comprehension then use compensatory strategies to address comprehension failure. (Metacomprehension is defined operationally as the score the learner achieves on the metacomprehension test used in this study. Metacomprehension test includes the following dimensions; prior knowledge, anxiety, organization, interest, surface text features, self-questioning, the ability to recall information.

1.4. Limitations of the Study

Generalizing the results of this study can be inhibited by the following:

1. The degree of the text validity and reliability.
2. The sample was chosen randomly from 10th grade female students enrolled in the public schools of Alrusiafah district directorate of education for the academic year 2011/2012) total number of (180). Hence the results are valid to generalize only on the population of this study and similar populations.

2. METHODS

2.1. Participants

The overall population consisted of (1933) female student enrolled in of 10th grade in academic year 2011/2012 from public schools in Alrusiafah directorate of education/ Amman/ Jordan. One hundred and eighty students were randomly chosen and recruited in the research. The students were distributed on four groups, (45) students in each group.

2.2. Measures

Two instruments were employed in the study.

First: A metacomprehension test. The researcher reviewed previous literature on metacomprehension and developed a test from: Moore *et al.* (1997) that included seven dimensions: Anxiety; Achievement; Strategy; Capacity; Task; Locus of Control and Organization. Anderson (2005) test ratings are based on Prior knowledge, the Ability to Recall Information, self-questioning while processing information, the ability to Summarize Texts; Interest and The Use of Surface Features of the Text. Schmitt (1990) includes six dimensions: Predicting and Verifying, Surface Features, Goals Setting, Self-questioning, Graphics and General Information and Summarizing.

The previous tests that have an effect on metacomprehension were reviewed by (9) faculty members from Jordanian universities, who identified seven dimensions of metacomprehension:

1. Familiarity (Prior knowledge). Previously learnt material from educational situations and life experiences and is not subject to distraction or forgetting.

2. Anxiety. A certain response for a pressurizing educational event. It may be a special case for one event or a special character for a set of events.

3. Organization. The learners' control of the process of learning by using few strategies such as goal setting, planning, monitoring, activating the relationship between prior and new experience and assessment.

4. Interest. The degree of attention that the learner gives to the subject.

5. Surface text features. Attending to the morphology of the text without looking deep into the meanings.

6. Self-questioning while processing information. Looking for new information in the text to enhance metacomprehension, by raising questions to the self while processing the information.

7. Ability to recall information. A response acquired from previous stimulus.

The metacomprehension test was translated into Arabic. Competent professors reviewed and compared the versions of the test.

Validity of the test was verified through;

Surface Validity: Professors majoring in educational psychology, measurement and evaluation, and learning and development from Yarmouk University, the university of Jordan, Zarka private university, Jadara University and the International Islamic university in Jordan reviewed the initial version of the test. They professors provided some remarks on the test items in terms of dimension representation, suitability to the age group, and the structure of the items. Based on these remarks, three items are excluded (70% of the reviewers agreed on their unsuitability) the total final number of items was (44).

Construct Validity: The test was administered on a pilot sample of (40) students to verify the construct validity. Correlation coefficients were calculated for each item with the total score of the dimension, as well as for each item with total score of the test, as seen in Table (1).

Table-1. Correlation Coefficient of Metacomprehension Based on Test Dimension and Overall Test

Subscale	N.	Item	Item Correlation	
			Subscale	Overall
Familiarity (Prior Knowledge)	1	I understand the text well because am familiar with it.	0.41	0.41
	2	I understand the text associated with what I learned more than other texts.	0.48	0.37
	15	I understand the topic little, if the text is new and I haven't heard about it before.	0.49	0.39
	16	I ask for help if am not familiar with the topic.	0.47	0.44
	27	I think about how to use prior knowledge while reading.	0.5	0.49
Anxiety	3	I feel jittery if I have to read a certain text.	0.52	0.47
	4	I get anxious when I am asked to answer questions associated to a certain text.	0.43	0.36
	14	I feel jittery when I do not understand the meaning of text I have read.	0.27	0.2
	35	Careful reading of the text helps me to understand and keeps me away from being anxious.	0.43	0.21
	36	I start reading easy texts, it makes me feel relaxed.	0.55	0.22
Organization	5	I evaluate myself while reading the text to ensure understanding.	0.27	0.26
	6	I divide the text before reading; this helps in understanding	0.35	0.27
	17	I look up words that I don't understand when reading.	0.54	0.45
	18	I reread topics that I do not understand several times.	0.41	0.33
	28	I check the words that are effective in the meaning of the text	0.47	0.42
	29	I look for essential information while reading a text.	0.47	0.45
	37	I define the goal of reading before reading the text.	0.44	0.42
	38	I connect new information in the text with prior knowledge	0.53	0.53
Interest	7	Being interested in the topic makes me ready to understand what the writer wants to transfer to me.	0.43	0.41
	8	Being interested in text comprehension increases my will to finish reading it.	0.51	0.46
	19	Not being interested in the topic decreases my focus on it.	0.38	0.29
	20	I think of the output of reading which encourages me to	0.4	0.36

		continue reading		
	30	When the topic is interesting my comprehension increases.	0.47	0.31
	31	When the topic is not interesting my comprehension decreases.	0.51	0.33
				Continue
	32	The thematic text makes it interesting and encourages me to continue reading.	0.54	0.37
Surface Text Features	9	It is difficult to understand the text that is full of boring details.	0.37	0.35
	10	The similar it ideas and themes in the text makes it difficult to distinguish between them.	0.31	0.2
	21	The text does not have details to explain its ideas.	0.5	0.35
	22	Long texts affects my understanding.	0.49	0.37
	39	I faced few difficult words in the text and that affected my understanding.	0.45	0.32
	40	I look to the text pages number before starting reading.	0.42	0.39
	43	I ask someone to read the text for me; this enhances understanding.	0.31	0.29
Self-questioning	11	Before reading texts, I usually formulate in my mind the questions that I hope to answer from reading.	0.34	0.32
	12	I try assuming what I think will happen in the read text.	0.47	0.37
	23	I try to determine the possible events in the text based on its title.	0.4	0.36
	24	I verify my assumptions while reading.	0.35	0.28
	41	I use self-questioning and assumptions to guide understanding in the text.	0.36	0.33
	42	I check the possibility of answering the self-questions after reading the text is finished.	0.36	0.35
	44	I use the monologue in order to direct attention and increase text comprehension.	0.51	0.51
Ability to Recall Information	13	Comprehending the main idea means that I can recall the content of the text.	0.45	0.31
	25	My memory is distracted by reaching the end of the text to be able to recall what I read.	0.4	0.37
	26	I have an ability to recall the texts I read.	0.47	0.46
	33	I reread the texts several times because it increases my ability to recall.	0.38	0.37
	34	I think of the existing information while reading, it improves recalling them.	0.34	0.31

Table (1) reveals that the correlation values between items and dimensions are high, ranging between (0.27-0.55), while correlation value with the test as a whole ranged between (0.20- 0.53), indicating an acceptable construct validity.

Internal consistency coefficient is calculated by Cronbach alpha in table (2).

Table-2. Internal Consistency and Repetition Based on Metacomprehension Overall Test and Dimensions

Metacomprehension dimensions	Internal consistency	Repetition	N
Familiarity (Prior Knowledge)	0.81	0.90	5
Anxiety	0.75	0.93	5
Organization	0.86	0.88	8
Interest	0.87	0.84	7
Surface text Features	0.82	0.88	7
Self-questioning	0.73	0.92	7
Ability to Recall information	0.88	0.85	5
Overall Test	0.91	0.84	44

As shown in table (2) internal consistency for the dimensions and the test ranged between (.73) and (.91), while test-retest reliability ranged between (.84) and (.93).

Second. Texts. Texts were chosen from non-curriculum Arabic material; "mashaheer assharq fe alqarn altase ashar" (Celebrities in the middle of the nineteenth century) (Zidane, 1992) as a historical difficult text, Cornelius Van Dyck an American Who Loved Asham, 2008 as a historical easy text. "Eclipses" (Qadri, 1943) as a scientific difficult text and "characteristics of the solar system" (Qadri, 1943) as a scientific easy text.

Text type, is the style in which the text ideas are represented; it is divided in this study into,

Historical easy words text, is the historian mental perception of historical facts present by indicators. The text is represented in easy and familiar words.

Historical difficult words text, is the historian mental perception of historical facts that are present by indicators. The text is represented by difficult and unfamiliar words.

Scientific easy words text, is the writing in a scientific style away from fiction, because it is meant to address the mind, to explain facts, and ambiguities. The text is written in easy familiar words.

Scientific difficult words text, is the writing in a scientific style away from fiction, because it is meant to address the mind, to explain facts, and ambiguities. The text is written in difficult unfamiliar words.

Specialized professors reviewed the texts and 90% of them agreed on validity of the texts for the purpose of the study.

2.3. Procedure

The test items were distributed on (7) dimensions. Subjects completed test items on a 5-point Likert scale ranging from (1) Never, (2) Rarely, (3) Sometimes, (4) Often and (5) Always. Consequently, the total score of the test as overall ranged between (44) and (220).

The texts were distributed among the students randomly, and the groups received instructions appropriate to their experimental group. All participants were instructed to complete the metacomprehension pretest, then to read two assigned texts, and finally completed the posttest.

3. RESULTS AND DISCUSSION

The main question in the study was about the effect of text type and difficulty on 10th grade female student's metacomprehension. Table (3) presents the means and standard deviations based on student's performance on metacomprehension pre and posttests.

Table-3. Means and Standard Deviations of Students Overall Performance on Metacomprehension Pre- and Posttests

Text type	Text difficulty	N.	Metacomprehensi		Metacomprehension	
			M.	SD.	M.	SD.
Historical	Easy	45	3.348	0.35	3.372	0.36
	Difficult	45	3.327	0.43	4.359	0.35
	Overall	90	3.338	0.39	3.865	0.61
Scientific	Easy	45	3.398	0.35	4.764	0.21
	Difficult	45	3.267	0.47	4.764	0.27
	Overall	90	3.333	0.42	4.764	0.24

Observed differences are noticed in Table (3) due to text type and text difficulty. To determine the significance of these differences a pretest analysis of subjects performance on metacomprehension, ANCOVA was used of the metacomprehension, and the results are displayed in Table (4).

Table-4. ANCOVA analysis of subjects metacomprehension posttest according to text type and difficulty after ruling out the effect of subjects performance on metacomprehension pretest.

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Metacomprehension	9.718	1	9.718	256.60	0.000	59.45%
Text type	36.532	1	36.532	964.64	0.000	84.64%
Text difficulty	12.907	1	12.907	340.82	0.000	66.07%
Text Type × Text	9.559	1	9.559	252.39	0.000	59.05%
Error	6.628	175	0.038			
Total	74.593	179				

Table (4) shows significant differences at (α=0.05) between means of subjects metacomprehension based on text type and difficulty is apparent. Significant differences at (α=0.05) between means of subjects metacomprehension based on the interaction between the text type and difficulty is also apparent. Revised means and standard errors of subjects performance on metacomprehension overall posttest based on text type and difficulty and the interaction between them is calculated to determine which variable was favored, and the results were as in Table (5).

Table-5. Means and standards errors of subjects metacomprehension posttest based on text type and difficulty and their interaction.

Text Type	Text Difficulty	Mean	Std. Error
Historical	Easy	3.364	0.03
	Difficult	4.364	0.03
	Total	3.864	0.02
Scientific	Easy	4.727	0.03
	Difficult	4.803	0.03
	Total	4.765	0.02
Easy		4.046	0.02
Difficult		4.584	0.02

Table (5) shows that metacomprehension overall differences are in favor of the subjects who completed the scientific text compared with the historical text. It also shows that the difference was in favor of the subjects who completed the difficult text compared with the group who completed the easy text.

It was found that moving from the easy to the difficult text had a positive effect on subjects metacomprehension, in both the historical and scientific texts, in favor of the scientific text. This may be due to the nature of the texts; the historical text tends to be direct, avoid excitement, make the reader feel he/ she is driven into a specific goal. The details and ideas are sequential which helps the reader to understand and recall general ideas, hence giving no need to use metacomprehension skills. While scientific texts create a cognitive gap among readers, drive their attention to the text which enhances their focus and hence increase the use of metacomprehension skills to process any failure in understanding. These results agree with the studies of Zabrucky and Moore (1999); Lin *et al.* (2000) and De Beni *et al.* (2007) which concluded that metacomprehension is better in expository texts, on the grounds that expository texts are more difficult in structure than narrative texts. On the other hand, this finding conflicts with the results of Linderholm *et al.* (2008) which concluded that metacomprehension is better in narrative texts, and the results of; Pierce and Smith (2001) and York (2006) who both concluded that there is no difference in metacomprehension due to text style. Text difficulty results may be interpreted by readers' lack of readability control over difficult texts. This inhibits the ability to infer the purpose of the written text, and to understand the relationship of cause and effect. Subjects resort to ongoing assessment of comprehension of the read material, which enhances the ability to distinguish between well understood and less understood texts increasing by metacomprehension. The previous result also agrees with the Pace (1979) and

McGinnis *et al.* (2007) who concluded that metacomprehension of narrative texts characterized by difficult unfamiliar words is significantly better than other familiar texts..

Means and standard deviations of subject's performance on metacomprehension dimensions posttest based on text type and difficulty are calculated and the results are as in table (6).

Table-6. Means and standards deviations of subjects performance on metacomprehension dimensions based on text type and difficulty

Source (Dimension)	Text Type	Text Difficulty	N.	Metacomprehension Pretest		Metacomprehension posttest	
				Means	sd	Means	sd
Familiarity (Prior Knowledge)	Historical Text	Easy	45	3.353	0.46	3.44	0.41
		Difficult	45	3.455	0.42	4.498	0.36
		Total	90	3.404	0.44	3.969	0.66
	Scientific Text	Easy	45	3.507	0.47	4.751	0.28
		Difficult	45	3.244	0.56	4.764	0.33
		Total	90	3.376	0.53	4.758	0.3
	Total	Easy	90	3.43	0.47	4.096	0.75
		Difficult	90	3.35	0.5	4.631	0.37
Anxiety	Historical Text	Easy	45	3.497	0.51	3.151	0.54
		Difficult	45	3.449	0.52	4.227	0.59
		Total	90	3.473	0.51	3.689	0.78
	Scientific Text	Easy	45	3.636	0.46	4.758	0.34
		Difficult	45	3.476	0.56	4.769	0.29
		Total	90	3.556	0.52	4.763	0.31
	Total	Easy	90	3.566	0.49	3.954	0.92
		Difficult	90	3.462	0.54	4.498	0.54
Organization	Historical Text	Easy	45	3.255	0.55	3.322	0.55
		Difficult	45	3.228	0.61	4.317	0.48
		Total	90	3.241	0.58	3.819	0.72
	Scientific Text	Easy	45	3.265	0.5	4.781	0.32
		Difficult	45	3.194	0.68	4.771	0.36
		Total	90	3.23	0.59	4.776	0.34
	Total	Easy	90	3.26	0.52	4.051	0.86
		Difficult	90	3.211	0.64	4.544	0.48
Interest	Historical Text	Easy	45	3.752	0.46	3.743	0.45
		Difficult	45	3.79	0.56	4.683	0.34
		Total	90	3.771	0.51	4.213	0.62
	Scientific Text	Easy	45	3.825	0.59	4.768	0.31
		Difficult	45	3.724	0.56	4.765	0.32
		Total	90	3.775	0.58	4.766	0.32
	Total	Easy	90	3.789	0.53	4.255	0.64
		Difficult	90	3.757	0.56	4.724	0.33
Surface Text Features	Historical Text	Easy	45	2.888	0.46	3.102	0.44
		Difficult	45	2.822	0.71	4.003	0.67
		Total	90	2.855	0.6	3.552	0.72
	Scientific Text	Easy	45	2.87	0.66	4.736	0.41
		Difficult	45	2.858	0.58	4.756	0.36
		Total	90	2.864	0.62	4.746	0.38
	Total	Easy	90	2.879	0.57	3.919	0.92
		Difficult	90	2.84	0.65	4.379	0.65
Self-questioning	Historical Text	Easy	45	3.28	0.61	3.356	0.53
		Difficult	45	3.27	0.67	4.375	0.5
		Total	90	3.275	0.64	3.865	0.72

		Easy	45	3.365	0.5	4.806	0.31
	Scientific Text	Difficult	45	3.155	0.7	4.775	0.36
		Total	90	3.26	0.62	4.79	0.33
	Total	Easy	90	3.323	0.56	4.081	0.85
		Difficult	90	3.212	0.69	4.575	0.47
Ability to Recall Information	Historical Text	Easy	45	3.516	0.49	3.484	0.51
		Difficult	45	3.378	0.6	4.413	0.49
		Total	90	3.447	0.55	3.949	0.68
	Scientific Text	Easy	45	3.453	0.58	4.747	0.39
		Difficult	45	3.293	0.59	4.747	0.4
		Total	90	3.373	0.59	4.747	0.39
	Total	Easy	90	3.484	0.53	4.116	0.78
		Difficult	90	3.336	0.59	4.58	0.48

In order to discover the metacomprehension differences in light of text type and difficulty, ANCOVA analysis was carried out ruling out the subject's performance effect on metacomprehension pretest based on text type and difficulty. The results are shown in Table (7).

Table-7. ANCOVA analysis of subjects metacomprehension dimensions based on text type and difficulty after neutralizing the impact of their pretest performance.

Effect	Test	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Familiarity (Prior Knowledge)	Hotelling's Trace	0.626	14.587	7	163	0.00	38.52%
Anxiety	Hotelling's Trace	0.018	0.409	7	163	0.896	1.72%
Organization	Hotelling's Trace	1.308	30.455	7	163	0.00	56.67%
Interest	Hotelling's Trace	1.201	27.956	7	163	0.00	54.56%
Surface text Features	Hotelling's Trace	1.714	39.906	7	163	0.00	63.15%
Self-questioning	Hotelling's Trace	1.136	26.447	7	163	0.00	53.18%
Ability to Recall Information	Hotelling's Trace	1.263	29.402	7	163	0.00	55.80%
Text Type	Hotelling's Trace	6.592	153.5	7	163	0.00	86.83%
Text Difficulty	Hotelling's Trace	2.489	57.96	7	163	0.00	71.34%
Text Type×Text difficulty	Wilks' Lambda	0.353	42.756	7	163	0.00	64.74%

Table (7) shows significant difference at (α=0.05) in overall metacomprehension due to text type and difficulty and the interaction between them. To determine which metacomprehension dimensions had that effect, an ANCOVA analysis was conducted on subject's performance in metacomprehension dimensions ruling out the effect of pretest, and the results were as in Table (8).

Table-8. ANCOVA analysis of subjects metacomprehension dimensions based on text type and difficulty and their interaction, ruling out the effect of pretest.

Dimension	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Familiarity (Prior Knowledge)	Familiarity (Prior Knowledge)	3.873	1	3.873	63.57	0	27.33%
	Anxiety	0.037	1	0.037	0.607	0.437	0.36%
	Organization	0.003	1	0.003	0.049	0.825	0.03%
	Interest	0.109	1	0.109	1.784	0.183	1.04%
	Surface Text Features	0.025	1	0.025	0.41	0.523	0.24%

	Self-questioning	0.014	1	0.014	0.236	0.628	0.14%
	Ability to Recall Information	0.137	1	0.137	2.248	0.136	1.31%
	Text Type	28.874	1	28.874	473.873	0	73.71%
	Text Difficulty	14.719	1	14.719	241.567	0	58.84%
	Text Type×Text Difficulty	8.003	1	8.003	131.347	0	43.73%
	Error	10.298	169	0.061			
	Total	74.578	179				
Anxiety	Familiarity (Prior Knowledge)	0.712	1	0.712	4.154	0.043	2.40%
	Anxiety	0.01	1	0.01	0.057	0.812	0.03%
	Organization	0.125	1	0.125	0.73	0.394	0.43%
	Interest	0.076	1	0.076	0.445	0.506	0.26%
	Surface Text Features	3.341	1	3.341	19.486	0	10.34%
	Self-questioning	0.091	1	0.091	0.532	0.467	0.31%
	Ability to Recall Information	0.016	1	0.016	0.091	0.764	0.05%
	Text Type	51.046	1	51.046	297.733	0	63.79%
	Text Difficulty	13.992	1	13.992	81.61	0	32.56%
	Text Type×Text Difficulty	10.796	1	10.796	62.972	0	27.15%
	Error	28.975	169	0.171			
	Total	114.807	179				
Organization	Familiarity (Prior Knowledge)	0.096	1	0.096	1.383	0.241	0.81%
	Anxiety	0.125	1	0.125	1.804	0.181	1.06%
	Organization	9.703	1	9.703	139.999	0	45.31%
	Interest	0.207	1	0.207	2.986	0.086	1.74%
	Surface Text Features	0.025	1	0.025	0.362	0.548	0.21%
	Self-questioning	0.064	1	0.064	0.917	0.34	0.54%
	Ability to Recall Information	0.006	1	0.006	0.087	0.768	0.05%
	Text Type	41.129	1	41.129	593.438	0	77.83%
	Text Difficulty	11.423	1	11.423	164.819	0	49.37%
	Text Type×Text Difficulty	10.665	1	10.665	153.884	0	47.66%
	Error	11.713	169	0.069			
	Total	97.211	179				
Interest	Familiarity (Prior Knowledge)	0.027	1	0.027	0.657	0.419	0.39%
	Anxiety	0.049	1	0.049	1.178	0.279	0.69%
	Organization	0.141	1	0.141	3.386	0.068	1.96%
	Interest	7.217	1	7.217	172.945	0	50.58%
	Surface Text Features	0.018	1	0.018	0.439	0.509	0.26%
	Self-questioning	0.012	1	0.012	0.289	0.592	0.17%
	Ability to Recall Information	0.008	1	0.008	0.182	0.67	0.11%
	Text Type	13.618	1	13.618	326.343	0	65.88%
	Text Difficulty	10.134	1	10.134	242.851	0	58.97%
	Text Type×Text Difficulty	8.229	1	8.229	197.208	0	53.85%
	Error	7.052	169	0.042			
	Total	56.497	179				
Surface Text Features	Familiarity (Prior Knowledge)	0.072	1	0.072	0.816	0.368	0.48%
	Anxiety	0.003	1	0.003	0.032	0.858	0.02%
	Organization	0.007	1	0.007	0.078	0.78	0.05%
	Interest	0.265	1	0.265	3.006	0.085	1.75%

	Surface Text Features	19.308	1	19.308	218.779	0	56.42%
	Self-questioning	0.012	1	0.012	0.139	0.71	0.08%
	Ability to Recall Information	0.071	1	0.071	0.801	0.372	0.47%
	Text Type	61.662	1	61.662	698.684	0	80.52%
	Text Difficulty	9.773	1	9.773	110.733	0	39.59%
	Text Type×Text Difficulty	9.068	1	9.068	102.75	0	37.81%
	Error	14.915	169	0.088			
	Total	123.542	179				
Self-questioning	Familiarity (Prior Knowledge)	0.021	1	0.021	0.255	0.615	0.15%
	Anxiety	0.07	1	0.07	0.851	0.357	0.50%
	Organization	0.004	1	0.004	0.054	0.817	0.03%
	Interest	0.091	1	0.091	1.101	0.296	0.65%
	Surface Text Features	0.219	1	0.219	2.657	0.105	1.55%
	Self-questioning	9.126	1	9.126	110.732	0	39.59%
	Ability to Recall Information	0	1	0	0.003	0.958	0.00%
	Text Type	38.521	1	38.521	467.398	0	73.44%
	Text Difficulty	13.035	1	13.035	158.16	0	48.34%
	Text Type×Text Difficulty	9.743	1	9.743	118.217	0	41.16%
	Error	13.928	169	0.082			
	Total	94.871	179				
Ability to Recall Information	Familiarity (Prior Knowledge)	0.201	1	0.201	2.904	0.09	1.69%
	Anxiety	0.053	1	0.053	0.767	0.382	0.45%
	Organization	0.001	1	0.001	0.018	0.895	0.01%
	Interest	0	1	0	0.001	0.976	0.00%
	Surface Text Features	0.012	1	0.012	0.178	0.673	0.11%
	Self-questioning	0.023	1	0.023	0.333	0.565	0.20%
	Ability to Recall Information	10.03	1	10.03	144.622	0	46.11%
	Text Type	31.672	1	31.672	456.676	0	72.99%
	Text Difficulty	13.706	1	13.706	197.627	0	53.90%
	Text Type×Text Difficulty	8.142	1	8.142	117.393	0	40.99%
	Error	11.721	169	0.069			
	Total	83.969	179				

Significant differences at (α=0.05) in posttest metacomprehension due to text type and difficulty were found. Moreover, significant differences at (α=0.05) were found in the means of metacomprehension due to the interaction between the two variables (text type and difficulty). Revised means and standard errors of metacomprehension dimensions due to text type and difficulty and the interaction between them are calculated to determine the favored group.

Table-9. Revised means and standard errors of subjects metacomprehension based on text type and difficulty and the interaction between them.

Dimension	Text Type	Text	Mean	Std. Error
Familiarity (Prior Knowledge)	Historical Text	Easy	3.45	0.04
		Difficult	4.467	0.04
		Total	3.959	0.03
	Scientific Text	Easy	4.695	0.04
		Difficult	4.841	0.04
		Total	4.768	0.03

	Total	Easy	4.073	0.03
		Difficult	4.654	0.03
Anxiety	Historical Text	Easy	3.152	0.06
		Difficult	4.224	0.06
		Total	3.688	0.04
	Scientific Text	Easy	4.734	0.06
		Difficult	4.794	0.06
		Total	4.764	0.04
	Total	Easy	3.943	0.04
		Difficult	4.509	0.04
Organization	Historical Text	Easy	3.307	0.04
		Difficult	4.322	0.04
		Total	3.814	0.03
	Scientific Text	Easy	4.776	0.04
		Difficult	4.785	0.04
		Total	4.781	0.03
	Total	Easy	4.042	0.03
		Difficult	4.553	0.03
Interest	Historical Text	Easy	3.75	0.03
		Difficult	4.674	0.03
		Total	4.212	0.02
	Scientific Text	Easy	4.747	0.03
		Difficult	4.788	0.03
		Total	4.767	0.02
	Total	Easy	4.248	0.02
		Difficult	4.731	0.02
Surface Text Features	Historical Text	Easy	3.089	0.04
		Difficult	4.026	0.04
		Total	3.558	0.03
	Scientific Text	Easy	4.736	0.04
		Difficult	4.745	0.05
		Total	4.74	0.03
	Total	Easy	3.912	0.03
		Difficult	4.386	0.03
Self-questioning	Historical Text	Easy	3.347	0.04
		Difficult	4.374	0.04
		Total	3.86	0.03
	Scientific Text	Easy	4.762	0.04
		Difficult	4.828	0.04
		Total	4.795	0.03
	Total	Easy	4.054	0.03
		Difficult	4.601	0.03
Ability to Recall Information	Historical Text	Easy	3.424	0.04
		Difficult	4.424	0.04
		Total	3.924	0.03
	Scientific Text	Easy	4.711	0.04
		Difficult	4.832	0.04
		Total	4.772	0.03
	Total	Easy	4.067	0.03
		Difficult	4.628	0.03

It is inferred from Table (9) that differences in metacomprehension dimensions came in favor of the group that had the scientific text compared with the group of the historical text. It is apparent also that these differences came in favor of the group of the difficult text compared with the easy text.

4. IMPLICATIONS

Based on the results of this study, we as educators have not given metacomprehension skills the needed time and effort given to other necessary skills required by learners to produce good readers. The gap still exists in the literature review of local and Arab studies treating metacomprehension. So more studies dealing with different text types such as explanatory, journalistic and scientific, as well as different variables such as gender and major in college are required to fill this gap, which may agree or disagree with the current findings.

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