

Research on the Relationship between Senior High School Learners' Critical Thinking Disposition and their Reading Comprehension Achievements: In Chinese EFL Context

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Abstract: This study aims to explore the relationship of senior high school learners' critical thinking disposition with their reading comprehension achievements in Chinese EFL context. 209 senior high students in Grade Three who were selected through convenient sampling procedure completed the Critical Thinking Disposition Inventory questionnaire and a reading placement test. Data were analyzed by descriptive statistics, Pearson correlation analysis and multiple linear regression analysis. The findings indicated a statistically significant correlation between critical thinking disposition and reading comprehension achievements especially in the dimensions of truth-seeking, cognitive maturity and open-mindedness. Besides, based on the regression analysis, truth-seeking and cognitive maturity can significantly predict students' English reading comprehension achievements, rather than open-mindedness. The findings testify the facilitative role of critical thinking disposition in reading comprehension.

1. Introduction

Critical thinking (CT) is one of the most important elements which influences learners' foreign language proficiency. And critical thinking disposition (CTD) is the psychological basis of critical thinking ability, which plays a guiding and driving role. Besides, English reading ability, as a crucial skill of English learning, has received much more attention in EFL environment. In the process of reading, readers can get information and communicate with the author, which shows it is a complex process including critical thinking. In China, it's limited to have access to English native speakers for communication, so reading is regarded as a vital way and to develop English as a foreign language. As such, the present study moves towards identifying senior high school EFL learners' characters of critical thinking disposition, as well as investigating the interrelationship between CTD and English reading achievements, taking Chinese EFL context as an example. With these objectives, the study is conducted on the basis of following questions: What is the current situation of senior high school students' CTD in Chinese EFL context? What is the correlation between senior high school learners' CTD and their English reading comprehension achievements? What are the key factors in CTD predicting senior high school students' English reading achievements?

2. Literature Review

2.1 Critical Thinking Disposition (CTD)

Currently, critical thinking is one of the main concepts considered in education area and also occupies an important place in second language learning. Most of researchers generally agree that critical thinking ability consists of two dimensions which are critical thinking skills and critical thinking disposition. They are closely related to personal character, life values and emotional attitudes, and have a certain degree of stability.

Ennis declares that a critical thinker must possess a certain set of disposition (i.e., attitudes), which could instruct him or her to engage in critical thinking[1]. Siegel, who describes disposition of critical thinking as a trend or thinking preference in a certain situation, claims that CTD is not an

act or a rule, but a potential tendency to guide these rules and behaviors[6] .

After proposing the definitions of critical thinking, Facione et al. proposed a conceptualization of CTD in the light of seven traits: truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness and maturity. And they designed the first instrument to measure CTD, namely the California Critical Thinking Disposition Inventory (CCTDI). In their opinion, thinking disposition tend to guide thinking skills to solve problems as well as to make decisions[3-4].

Wen defined CTD as the personality traits of a person’s critical thinking[8]. In order to measure CTD, she revised the questionnaire of CCTDI and form the Critical Thinking Disposition Inventory to test students’ CTD which is more appropriate with Chinese context. Besides, the dimension of justice-orientedness was added in Wen’s inventory, which was regarded as the basis of all critical thinking activities. In Chinese EFL learning context, this study will adopt the inventory proposed by Wen .

In Wen’s classification, academic dimension and social dimension are combined into critical thinking disposition[9]. Among them, academic dimension is mainly related to curriculum learning, while social dimension is mainly correlated with interpersonal activities (Figure 1).

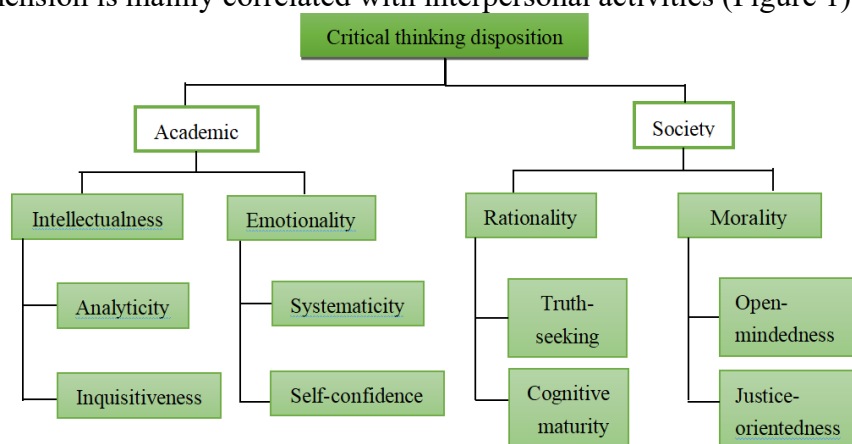


Figure 1 Four-level structure of CTD

2.2 Critical Thinking Disposition and English Reading

Reading is a multi-level cognitive process. Critical thinking plays an important role in reading comprehension, and several scholars put forward the concept of critical reading.

Fahim and Komijani also point out that critical thinking can improve learners’ learning styles, and it can also improve reading comprehension in the process of helping learners analyze the logical structure of texts[2]. In 2011, they conducted another similar study to explore the interrelationship between critical thinking skills, resilience, and reading comprehension containing unknown vocabulary. The findings suggest that critical thinking has a significant impact on learners’ reading ability. Vivanco conducted action research on the teaching of critical reading and found that students’ critical thinking skills, and their motivation to participate in the classroom were both improved[7].

Many Chinese scholars examine the correlation between CTD and English reading in EFL context. He Qing examines the relationship between these two factors at three universities, which finally shows a positive correlation, especially in the sub-dimension of Open-mindedness and Cognitive maturity[5].

In English reading comprehension, various questions and tasks are adopted to examine students’ level of understanding and different kinds of abilities. In Chinese college entrance examination, the English reading comprehension test is gradually shifting from knowledge-oriented to competence-oriented, which emphasizes more on learners’ understanding of the context and their critical thinking as well as reading skills. Therefore, it places higher requirements on learner’s critical thinking ability. Chinese National College Entrance Examination English Subject Description (2017 Edition) points out that the objectives of English reading comprehension include

five categories: grasping the details of the text, guessing meanings according to the context, reasoning based on the context, summarizing the main idea and understanding the structure of the article. This study mainly focuses on four English reading abilities as shown in Figure 2.

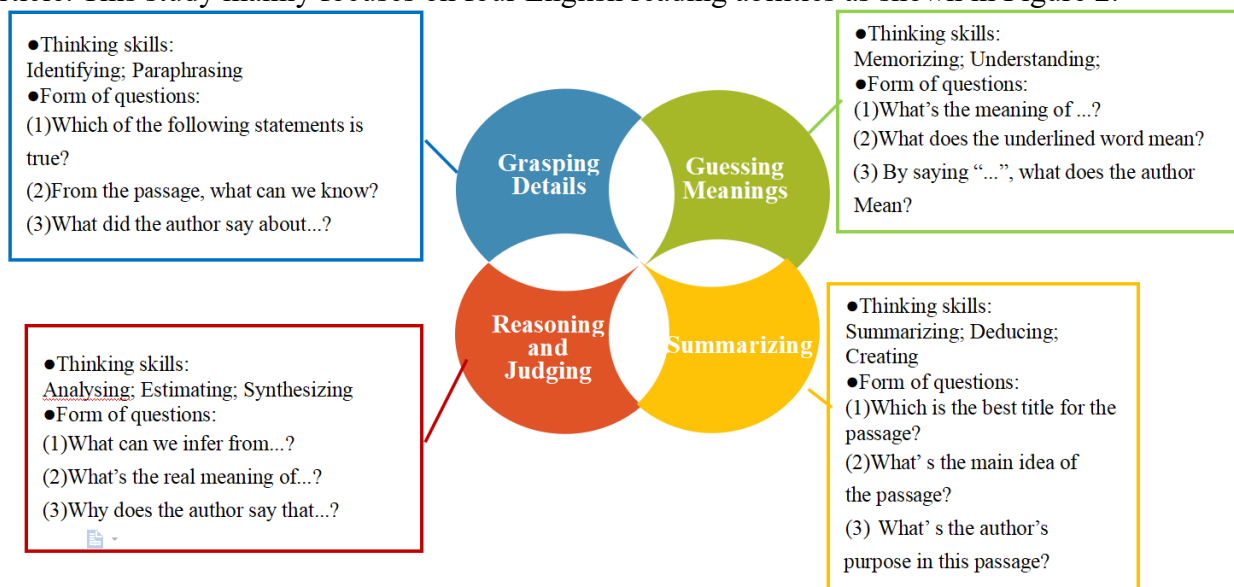


Figure 2 Four questions types of reading comprehension

3. Method

3.1 Participants

The research uses a questionnaire and 4 reading passages to collect data. In order to ensure the comprehensive and reliable data collection, the participants were randomly selected from Grade Three students attending a senior high school in a province in the northwest region of China, where students learn English as a foreign language. The total sample is comprised of 184 Senior Three students, whose ages varied between 17 and 19. And all of the 184 questionnaires were collected with 153 valid questionnaires including 71 female students and 82 male students. Table 1 shows a general description of the background information of the participants.

Table 1 Demographic Information of the Participants

Items		Frequency	Percentage%
Gender	Male	82	53.59%
	Female	71	46.41%
Class	Class 1	40	26.14%
	Class 2	39	25.49%
	Class 6	39	25.49%
	Class 7	35	22.88%

3.2 Instruments

In the study, two instruments were employed to collect data. A reading comprehension placement test was conducted to determine the level of the participants and to gather the achievements. The questionnaire of Critical Thinking Disposition Inventory revised by Wen Qiufang on the basis of Facione's CCTDI was also used, in order to measure students' current situation of critical thinking disposition. The placement test and the questionnaire were described in detail as follows.

3.2.1 Critical Thinking Disposition Inventory (CTDI)

In order to assess participants' CTD, the Chinese version of Critical Thinking Disposition Inventory revised by Wen is adopted. In 2009, Wen revised the inventory and added one dimension which is justice-orientedness. After revision, the new version of CCTDI contains 50 items and it

conforms to the Chinese cultural context.

In order to ensure the internal consistency reliability, the researcher retested the Cronbach's alpha coefficient of the inventory. Accordingly, this study deleted six invalid questions, and the number of items remained 44. This assessment instrument is a six-point Likert Scale ranging from "totally disagree" to "totally agree". The Cronbach's alpha coefficient of the new scale is .831. On the whole, the reliability of the scale meets the statistical requirements well. The items contained in each dimension are shown in Table 2 below.

Table 2 Items Distribution of Critical Thinking Disposition Inventory

Name	Cornbach's Alpha	Category	Level	Dimensions and Item No.	N of Items
Critical Thinking Disposition	.831	Academic	Intellectualness	Analyticity: 14, 20, 36	3
				Inquisitiveness: 4, 10, 19, 21, 27, 35	6
			Emotionality	Systematicity: 7, 12, 24, 39	4
				Self-confidence: 1, 6, 11, 17, 23, 31, 38	7
		Society	Rationality	Truth-seeking: 5, 9, 16, 22, 30, 43	6
				Cognitive maturity: 3, 26, 28, 32, 34, 40	6
			Morality	Open-mindedness: 15, 29, 37, 41, 42, 44	6
				Justice-orientedness: 2, 8, 13, 18, 25, 33	6

3.2.2 English reading comprehension test

The English reading comprehension test used in this study are selected from previous Chinese National College Entrance Examination English test. This set of English test contains 4 reading comprehension passages and 15 multiple-choice questions, and each question is originally scored 3 points, for a total of 45points.

The reading comprehension test consists of four question types, which are divided into students' ability of grasping details, guessing the meaning of words, reasoning and judging, and summarizing the main idea. Since the number of each type of questions is different, standardized statistics are carried out according to the proportion of the number of each question type, as shown in Table 3.

Table 3 Items Distribution of English Reading Comprehension Test

Question Types	Item Number
Grasping details	21, 22, 24, 25, 26, 28, 30, 34
Guessing Meanings	29
Reasoning and Judging	27, 32, 33, 35
Summarizing and Understanding	23, 31

3.3 Procedure

Before the research, a pilot study with 39 students was made to check the reliability of the questionnaire. During the pilot test, the statements of some items were found ambiguous and invalid. Some invalid items were cut off accordingly. The results showed the alpha of CTDI is .831, which means the questionnaire is reliable.

Then, the questionnaire and the reading test paper were distributed to participants. The writer distributed 184 questionnaires and collected 153 valid ones. After that, achievements of the English reading comprehension test were collected, including the overall score and the score of each question type.

3.4 Data analysis

The quantitative data were analyzed by using SPSS 22.0. The descriptive statistics of the questionnaire are presented concerning the minimum, maximum, means and Standard Deviation, which will reveal the general situation of senior high students' CTD, and their reading comprehension achievements. Then, Pearson correlation analysis is conducted to check out whether there exist some relationships between CTD and their English reading achievements. In addition,

multiple linear regression analysis is used in order to figure out to what extent CTD can predict English reading achievements.

4. Results

4.1 Descriptive Analysis of CTD and English Reading Achievements

In order to know better about senior high school students' general situation of critical thinking disposition, the descriptive analysis has been done, which contains eight dimensions proposed by Wen. The descriptive statistics are presented in Table 4 as follows.

Table 4 Descriptive Statistics of CTD

Item	N	Min	Max	M	SD	Sequence
Analyticity	153	17	53	39.058	7.282	4
Inquisitiveness	153	27	53	40.971	5.552	1
Systematicity	153	15	55	34.870	7.7	8
Self-confidence	153	29	55	39.39	6.437	3
Truth-seeking	153	30	57	39.522	6.641	2
Cognitive maturity	153	22	52	36.116	8.177	6
Open-mindedness	153	22	53	38.536	6.623	5
Justice-orientedness	153	23	48	35.362	7.189	7
Total Score of CTD	153	163	339	303.188	26.977	

Table 5 Descriptive Statistics of Different CTD Groups

Item	N	Percentage (%)	Score range
High CTD group	81	52.9 %	[280, 480]
Low CTD group	72	47.1 %	[80, 279]

As shown in Table 4, the minimum of CTD is 163, and the maximum is 339 which reaches a relatively high level. Besides, the mean is 303.188 which means the general CTD of senior high students is in a positive tendency ($M > 280$). It can be seen from Table 5 that high CTD group occupies 52.9 % of the total samples.

Among these eight dimensions, inquisitiveness is in a positive tendency ($M > 40$), which means students are eager for new things. And it's followed by truth-seeking, self-confidence and analyticity. These results are basically consistent with previous studies (Wen, 2012) It indicates that senior high students are willing to accept something challenging, explore the truths and laws and have strong desire to learn new things, which shows that they are aware of the importance of learning. Among these dimensions, systematicity ranks the last, which demonstrates to some extent, senior high students are shot of concentration and persistence when they deal with something complex. This reflects the characteristics of self contradiction in CTD of contemporary senior high students. They have curiosity about new things and have the spirit of exploration, but they lack the perseverance to achieve long-term goals.

Besides, in order to get a general idea of senior students' English reading ability, a statistical analysis of the English reading comprehension achievements is also conducted. Due to different numbers of four question types in the test, the study sets the total score of each question type as 1 point in order to unify the score.

Table 6 Descriptive Statistics of English Reading Comprehension Achievements

Item	N	Min	Max	M	SD	Sequence
Grasping details	153	0.32	1	0.77	0.35	1
Guessing Meanings	153	0	1	0.57	0.25	2
Reasoning and Judging	153	0	1	0.44	0.20	4
Summarizing and Understanding	153	0	1	0.54	0.30	3
Total Score	153	8	39	28.5	6.433	

As can be seen from the data in Table 6, English reading comprehension achievements was a minimum of 8 a maximum of 39, a mean of 28.5, and a standard deviation of 6.433. It indicates that the English reading comprehension ability of senior high students is generally at the upper middle level, but there is a large gap between the high and low levels. Besides, the ability of grasping details ranks the first, whereas the questions of reasoning and judging rank the last, which shows that in the process of reading, students are best at finding detailed information, judging facts and guessing meanings from the context. However, students' ability to summarize the main idea and infer the information according to the context is a little insufficient. It reflects the lack of students' critical thinking ability to analyze, synthesize and reason.

4.2 The Correlation Between CTD and English reading achievements

In order to investigate whether English reading achievements of senior high students are affected by critical thinking disposition and its sub-dimensions, the researcher conducted a correlation analysis on the dimensions of CTD and the achievements of each type of questions in English reading comprehension. The results are shown in Table 7.

Table 7 The Correlation between CTD and English Reading Achievements

Item	Grasping details	Guessing Meanings	Reasoning and Judging	Summarizing and Understanding	Total Score
Analyticity	.091	.341**	.732**	.046	.364**
Inquisitiveness	.079	.122	.383**	.009	.087
Systematicity	.026	.031	-.028	.088	.049
Self-confidence	-.014	-.079	.023	-.048	-.089
Truth-seeking	.204**	.033	.075	.451**	.209**
Cognitive maturity	-.091	.023	.078	.203**	.260**
Open-mindedness	.039	-.077	-.021	.132	.188
Justice-orientedness	-.032	-.151	-.011	.025	-.083
Total Score of CTD					.630**

** $P \leq 0.01$

The results provide insight into the relationship between the variables of CTD and English reading achievements (Table 7). It indicates that there is a basically moderate and positive correlation between general CTD and general English reading achievements ($r = 0.630$, $p < 0.01$). That means students who own a high critical thinking disposition will grasp details and main idea of passages easily and be able to analyze and infer more information on the basis of the context.

In addition, general English reading achievements have a significant positive correlation with three sub-dimensions of CTD including analyticity, truth-seeking and cognitive maturity. Reading comprehension is a process of analyzing and reasoning about the information given in the text, identifying the meaning of the text, and exploring the truth. In this process, readers need to understand the author's views, attitudes and values conveyed in the passage. According to Wen (2012), students with a higher degree of truth-seeking have a strong desire to learn about the truth of things, and are good at breaking through difficulties. Students with relatively higher level of cognitive maturity and analyticity are able to analyze and deal with problems in a better way, so they can deeply understand the gist of the passage, and will not be confused by literal information. English reading comprehension is not only an investigation of students' words and syntax, but also reflects the values and some typical issues in social life. Students who often observe and consider social events in life, are likely to have a strong problem consciousness, and easier to interpret the reading materials.

4.3 The Regression Analysis of Three Positive Dimensions of CTD on English Reading achievements

According to the above data in previous sections, we can clearly understand there is a certain covariant relationship among the three variables of analyticity, truth-seeking and cognitive maturity. This section mainly establishes regression model through multiple linear regression analysis in

order to distinguish the specific relationship among the variables. Multiple linear regression analysis is used to test whether the three dimensions can predict reading achievements.

Table 8 Multiple Linear Regression: Important Statistics (n=153)

	Variables	R	R ²	Adjusted R ²	Beta	T	Sig	Tolerance	VIF
DV	English reading achievements	.547	.302	.299					
IV	Analyticity				.167	3.717	.005*	.605	1.624
	Truth-seeking				.250	4.054	.000*	.663	1.601
	Cognitive maturity				.100	1.935	.041	.832	1.177

* $P \leq 0.05$

The regression method is “enter”, which shows that the combination of these variables significantly predicted senior high students’ English reading achievements, with the variables of analyticity, truth-seeking and cognitive maturity significantly contributing to the prediction ($p \leq 0.05$).

And the beta weights suggests that cognitive maturity contribute most to predicting students’ English reading achievements. The R square value is 0.302, which indicates 30.2% of the variance of English reading achievements are predicted by this model. According to the table, analyticity ($p = .004$) and truth-seeking ($p = .000$) can significantly predict students’ English reading comprehension achievements, rather than cognitive maturity ($p = .052$).

5. Discussion

This research is carried out to examine the current situation of CTD, and the nature relationship between CTD and English reading achievements of senior high school learners who are learning English as a foreign language. It also explores the key factors of students’ CTD affection English reading achievements.

From the descriptive analysis of critical thinking disposition, it has indicated that the general situation of senior high school learners’ CTD is in a moderate positive tendency. Among the eight dimensions, inquisitiveness is in the positive tendency, and the others are in a relatively negative tendency. It means senior high students are curious about new things and willing to explore the truth. In addition, the general English reading comprehension ability of senior high school students has reached a medium level, but there is a large gap between high and low levels. Specifically, students performed best in grasping details, followed by guessing the meaning of words and the ability of summarizing the main idea. In contrast, they lack of skills in reasoning and judging.

The results of the correlation analysis provide insight into the relationships between the variables of CTD and English reading achievements. The analyses discussed above indicate that there is a basically moderate and positive correlation between them. To be specific, English reading achievements have a significant positive correlation with three sub-dimensions of CTD containing analyticity, truth-seeking and cognitive maturity. Among them, analyticity and truth-seeking can significantly predict students’ English reading comprehension achievements.

As a whole, the present study indicate that critical thinking disposition is an essential element for learners in order to perform successfully in English reading.

6. Conclusion

Collectively, the present study described the details of how critical thinking disposition influence the performance in English reading of senior high school students in Chinese EFL context. As mentioned, there is a positive relationship between them especially in the dimensions of truth-seeking, cognitive maturity and open-mindedness, among which the former two elements reveal a better prediction in students’ reading achievements.

Based on previous conclusions, the research obtain implications in three aspects. To begin with,

it's necessary to attach importance to the cultivation of critical thinking disposition through different reading tasks. Teachers can encourage students to read with critical ideas and apply more time to the deep exploration of text connotation. Besides, extracurricular reading activities need to be organized to improve students' English reading literacy. Finally, it's a better way to build a standard for critical thinking cultivation and to improve the evaluation system concerning reading ability which combines summative assessment and formative assessment.

Because of the limited scale, which only explores the situation of senior high school students in Grade Three, the present result cannot reflect the overall status quo of Chinese EFL learners. Future researches need to be expanded in depth and breath for providing authentic and reliable gist. In addition, functions and conditions of data should be analyzed more meticulously and thoroughly.

References

- [1] Ennis, R. H. *Teaching thinking skills: Theory and practice*. New York: W. H. Freeman, pp. 68-73, 1987.
- [2] Fahim, M., Komijani, A. "Critical Thinking Ability, L2 Vocabulary Knowledge, and L2 Vocabulary Learning Strategies". *Journal of English studies*, vol.1, no.1, pp. 23-38, 2010.
- [3] Facione, P. A. *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. New York: American Philosophical Association, pp.181-185, 1990.
- [4] Facione, P. A. *California critical thinking skills test*. Millbrae, CA: The California Academic Press, pp. 20-21,1990.
- [5] He Qing. "The Influence of Critical Thinking Disposition on Reading Strategies of English Major". *Journal of Fujian Medical University (Social Science Edition)* . vol. 18, no. 3, pp. 58-62, 2017.
- [6] Siegel, H. *Educating reason: Rationality, critical thinking and education*. New York: Routledge, pp.203-204, 1988.
- [7] Vivanco, V. "Critical Reading of Research Articles as Oral Activator in the Language Class". *Turkish Online Journal of Distance Education*. Vol. 13, no.3, pp.121-134, 2012.
- [8] Wen, Q. F., Wang, J. Q., Zhao, C. H., et al. "On the construction of the conceptual framework for accessing Chinese college students' critical thinking skills". *Foreign Language World*, vol.1, no.1, pp. 37-43, 2009.
- [9] Wen Q.F. *Research on the current situation of Chinese foreign language college students' critical thinking ability*. Beijing: Foreign Language Teaching and Research Press, pp. 201-202, 2012.