Effects of Critical Thinking Disposition on Foreign Language Proficiency in Foreign Language Learning: Evidence from China

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Abstract
Critical thinking is among the variables that have recently become increasingly prominent in foreign language learning. However, there is a biased research focus on the role of CT skills, and empirical evidence on the relationships between CT disposition and foreign language learning is scant. This cross-sectional study aimed to bridge this gap by examining the effects of overall CT disposition as well as its sub-constructs (open-mindedness, perseverance, reflectiveness, inquisitiveness, and self-confidence) on foreign language proficiency. The study mainly discussed the research questions of how CT disposition was related to and to what extent it could predict learners' foreign language proficiency. This research employed Pearson correlation analysis, regression analysis, and one-way ANOVA to analyze the data collected from a sample of 391 Chinese foreign language learners at Jiangxi Normal University and Zaozhuang University. The instrument adopted to assess the participants' CT disposition was newly proposed in Chinese in the current study. The results demonstrated that both overall and sub-constructs of CT disposition were positively related to learners' foreign language proficiency. Foreign language learners embracing different levels of CT disposition displayed significant differences in their foreign language proficiency. Except for perseverance, the other four dispositional traits (open-mindedness, reflectiveness, inquisitiveness, and self-confidence) toward CT were found to be significantly positive predictors of learners' foreign language proficiency in the Chinese context. The positive impacts of CT disposition triggered in foreign language learning in the present research give an empirical grounding to the cultivation of foreign language learners' CT dispositional factors to facilitate their foreign language development. Implications, limitations, and recommendations for future exploration and research were also discussed.

Keywords: Critical thinking disposition, Chinese EFL learners, language achievement, foreign language proficiency, relationship, scale

Introduction

Critical Thinking (CT) has been identified as one of the 21st core competencies that students should cultivate across diverse subject curriculums (Yuan, Liao, Wang, Kong, & Zhang, 2022). Accordingly, it has become increasingly prominent in foreign language education (Din, 2020; Li, 2016). CT cultivation has been placed as a premium stipulated in foreign language curriculum guidelines and textbooks used in foreign language contexts (Yuan et al., 2022). Moreover, it has been highlighted as an essential requirement for foreign language study (Din, 2020) for its contribution to enhancing general language proficiency (Liaw, 2007), facilitating the development of language skills (Wang & Henderson, 2014; Wu, Marek, & Chen, 2013), and stimulating foreign language learners' linguistic awareness (Wijnands, Rijt, Stoel, & Coppen, 2022). Empirical evidence also confirmed the effectiveness of its incorporation into foreign language instruction (Chapple & Curtis, 2000). As for CT, there are various conceptualizations, among which is a consensus referring to it as a concept composed of both cognitive skills and dispositional traits (Cheng & Wan, 2017), which are two different aspects of CT, namely cognitive aspect, and emotional aspect respectively (Ennis, 1987; Toplak & Stanovich, 2002). From a cognitive perspective, CT involves using conscious and suitable skills or techniques to attain a particular goal (Halpern, 1998). From an emotional perspective, it is a tendency to use specific thinking skills (Norris, 1992; Valenzuela, Nieto, & Saiz, 2011), and a consistently stable internal motivating force for deciding what to do and believe based on CT skills (Facione, 2000). Students with CT disposition tend to employ CT when solving and analyzing problems (Giancarlo & Facione, 2001; Orhan, 2022b). Based on previous research, ideal critical thinkers are open-minded, inquisitive, self-confident (Facione & Facione, 1992), reflective (Quinn, Hogan, Dwyer, Finn, & Fogarty, 2020; Sosu, 2013), and perseverant (Dwyer, Hogan, Harney, & Kavanagh, 2017; Quinn et al., 2020). However, foreign language students who can apply CT skills in language learning may be unable to employ these skills if their disposition toward CT is constrained (Valenzuela et al., 2011). Moreover, the disproportionate focus on one dimension of CT would lead to pre-critical (indicating high skills and low disposition) (Wan & Cheng, 2018), or over-critical (showing low skills and high disposition) of CT (Brink-Budgen, 1999), and thus hinder foreign language learners' CT development.

Unfortunately, although research on CT has developed to encompass both CT skill and disposition (Facione, 2000), previous studies on CT in the field of foreign language education have almost exclusively devoted to examining the role of the skill aspect of CT in foreign language learning (e.g., Afshar & Movassagh, 2014; Heidari, 2020). Little progress has been made in disclosing the associations between disposition toward CT and foreign language learning (Ku & Ho, 2010). To put it another way, what role CT disposition play in foreign language learning is still veiled and unclear. Additionally, a reliable Chinese scale used for assessing Chinese learners' CT disposition is not available (Fan & See, 2022).

Grounded on the urgent need mentioned in the study, this study aims to uncover the effects of CT disposition on foreign language learning in the Chinese context. Before that, a Chinese CT disposition scale would be developed to measure Chinese foreign language learners' CT disposition. The impetus for conducting the present study stems from drawing educators' attention to nurture foreign language learners' CT disposition to enhance their foreign language learning. The findings of the current research could bring new insights to the understanding of the vital role of CT disposition in facilitating foreign language learners' language development and arouse

researchers as well as educators' awareness of boosting foreign language learners' dispositional traits toward CT to generate a better development of foreign language. For the aims mentioned above, the research questions in the study were constructed as follows: **(RQ1)** How reliable and valid is the newly proposed Chinese Critical Thinking Disposition Scale (CHCTDS) used to measure foreign language learners' CT disposition? **(RQ2)** How are the general score as well as subscale score of CT disposition related to students' foreign language proficiency? **(RQ3)** To what extent do foreign language learners' CT disposition predict their foreign language proficiency? **(RQ4)** How do foreign language learners with a high, middle, and low disposition toward CT differ in their foreign language proficiency? The paper was structured by reviewing the previous research investigating CT and foreign language learning in the body. Then, the research design of the study was introduced, which was followed by the results and discussion of the study. The conclusion of the study and recommendations for further research were provided in the last part.

Literature Review

The pivotal role of CT for foreign language learners to achieve success in foreign language learning has been identified (Davidson, 1998) in many studies. Meanwhile, several empirical studies have also investigated the correlations between CT and different language skills, with a majority of them focusing on reading (e.g., Aghajani & Gholamrezapour, 2019; Heidari, 2020; Hosseini, Khodaei, Sarfallah, & Dolatabadi, 2012), and writing (e.g., Afshar, Movassagh, & Radi Arbabi, 2017; Nguyen & Nguyen, 2020). As for the link between CT skills and foreign language writing, contradictory findings have been reported. One explanation of the mismatch was that only writing ability in the previous studies was surveyed, without knowing the participants' general foreign language proficiency, which could also hinder students' demonstration of their writing ability (Pei, Zheng, Zhang, & Liu, 2017). Another possible reason was that there were two different dimensions in CT: skill and disposition (Cheng & Wan, 2017). Individuals have the skill and ability to think critically but may lack an attitudinal disposition toward CT, thus generating inconsistent results with the previous studies (Nguyen & Nguyen, 2020). To put it another way, CT disposition was another factor possibly playing a critical role in influencing students' foreign language learning.

Disappointedly, unlike the abundant studies focusing on the role of CT skills, very minimum studies have provided empirical evidence on the impacts of CT disposition on foreign language learning (Ku & Ho, 2010). Among the limited studies, Ünaldı and Yüce (2021) conducted a correlational study among 126 university language learners in Turkey by measuring participants' CT disposition with the California Critical Thinking Disposition Inventory scale (CCTDI) to investigate the possible connections among foreign language vocabulary size, grammatical competency, and CT disposition. They found that foreign language vocabulary size scores were associated significantly with some constructs of CT disposition, such as inquisitiveness and confidence in reasoning (Ünaldı & Yüce, 2021). Whereas different from their vocabulary size scores, participants' grammar proficiency scores were significantly associated with truth-seeking, systematicity, maturity subscales, and their overall CT disposition scores (Ünaldı & Yüce, 2021). In addition to the scarce research investigating the relationship between foreign language learning and CT disposition in general, several previous studies on personal traits have revealed the close tie of language development to some constructs of CT disposition, such as self-confidence (e.g., Clément, Dörnyei, & Noels, 1994; Ozdemir & Papi, 2021), and perseverance (e.g., Pawlak, Csizér, Kruk, & Zawodniak, 2022; Teimouri, Plonsky, & Tabandeh, 2020). Moreover, the positive

influence of inquisitiveness (e.g., Tang, Duan, Wu, & Cheng, 2019), open-mindedness (e.g., Jackson, 2016), and reflectiveness (e.g., Reeve, 2009; Wijnands et al., 2022) on school achievement have also been documented. Given this point, it was assumed that CT disposition would exert significantly positive impacts on foreign language learning, and the influence of each dispositional factor may differ as well (Ünaldı & Yüce, 2021).

However, although studies concerning the associations between CT disposition and different language skills or the relationship between individual CT dispositional traits and language learning existed, empirical research about how general disposition toward CT as well its constructs are related to general foreign language proficiency is rare, and the investigation of the CT disposition of Chinese students are even rarer (Fan & See, 2022). Moreover, whether foreign language learners with various levels of CT disposition differ in their foreign language proficiency, and to what extent foreign language learners' CT disposition can predict their foreign language proficiency is unclear too. Additionally, some problems such as a weak internal consistency across factors (Ip et al., 2000), low subscale alpha values (Orhan, 2022a), and high cross-factor loadings (Walsh & Hardy, 1997; Walsh, Seldomridge, & Badros, 2007) were identified in the instrument California Critical Thinking Disposition Inventory scale (CCTDI) Ünaldı and Yüce (2021) adopted in their study. Apart from that, the original English version of the CCTDI was adopted in their study, which might result in an inappropriate justification of participants' CT disposition due to the formidable barrier caused by insufficient foreign language proficiency (Fan & See, 2022; Keihaniyan, 2013).

Due to the dearth of research efforts on disclosing the influence of critical thinking (CT) disposition on foreign language learning, and based on the research gaps mentioned in the literature, there is still room for more studies to be conducted on the topic to shed more lights on the relationships between CT disposition and foreign language learning to make them more generalizable (Snider, 2017). To bridge this research gap, the purpose of the current cross-sectional study is to explore the effects of foreign language learners' CT disposition on their foreign language learning in the Chinese context by adopting a quantitative approach. In this study, not only the general performance of CT disposition would be investigated, but also their sub-constructs which included open-mindedness, perseverance, reflectiveness, inquisitiveness, and self-confidence. Since most measurements of CT were developed in the language of English (Fan & See, 2022), the reliability of those assessments would decrease due to the barriers to English language proficiency (Moosavi, 2022). To improve the reliability and accuracy of the assessment of Chinese learners' CT disposition, the Chinese Critical Thinking Disposition Scale (CHCTDS) was proposed and validated to assess foreign language learners' CT disposition in the Chinese language to address the gap of lacking an appropriate instrument tailored for assessing foreign language learners' CT disposition in Chinese language (Fan & See, 2022).

Method

To fulfil the purpose of examining the effects of CT disposition on foreign language proficiency in foreign language learning in this research, a correlational quantitative research design was employed as it could facilitate generalised findings to a larger population, provide broader information (Frankfort-Nachmias & Nachmias, 2007), and analyze the data at a lower cost in a precise and easier way (Patton, 2002).

Participants

A total of 391 (330 female and 61 male) Chinese foreign language learners were recruited from Jiangxi Normal University and Zaozhuang University in China in convenience sampling. To make the National Matriculation English Test (NMET, whose score would be used to represent the participants' foreign language proficiency in this study. The detailed introduction to it was in the next section) score more comparable, students in this study should be of the same grade. Because first-year students newly enrolled have just finished their NMET this June, and they have a more accurate memory of their NMET score than students in any other grade, thus, all the participants in the current research were first-year students in the academic year 1/2022.

Research Instruments

Demographic Information Survey

A demographic survey was developed to gather information on the student's age, grade, gender, and NMET score. English as a Foreign Language (EFL) is offered as a compulsory academic subject from the third year in primary school to the second year at universities nationwide in China (Jiang, 2003), which means that every Chinese EFL learner spends at least over ten years on English language learning. Hence, Chinese EFL learners are equilibrium to Chinese foreign language learners in this study. As one of the three compulsory tests for all test takers in the National Matriculation Entrance Test (called *Gaokao* in Chinese), the largest and most significant university entrance test in China (Liu, 2010), NMET seeks to measure Chinese students' EFL proficiency. Since it is the national test that every Chinese university EFL learner must attend and is a high-stake English test with high reliability (Li, 1990), validity (Lin, 2015), fairness (Zhang, 2019), and discrimination power (Cheng & Qi, 2006), Chinese students' foreign language proficiency in this study would be represented by their score in NMET.

The Chinese Critical Thinking Disposition Scale (CHCTDS)

In the current study, the CHCTDS was newly developed to measure foreign language learners' CT disposition specifically. It was a Chinese instrument freshly proposed by the researchers to measure Chinese foreign language learners' CT disposition based on previously existing dispositional scales. Its reliability and validity were validated by employing exploratory and confirmatory factor analysis in a preliminary study. The results of the factor analysis showed that the CHCTDS composed of five constructs was an acceptable model fit with good reliability and validity. The Cronbach's α of the overall scale was 0.93 (ranging from 0.78 to 0.85 for the five subscales). The CHCTDS is a seven-point Likert scale instrument (One represents "strongly disagree and seven means "strongly agree") with 17 items in five constructs: open-mindedness (four items); perseverance (three items); reflectiveness (three items); inquisitiveness (four items), and self-confidence (three items). A score was given for each item, in the range of one score for "strongly disagree" to seven scores for "strongly agree", thus generating five subscale scores and a total score. The maximum and minimum score for the general scale is 119 and 17. A score less than 68 suggests a deficiency in CT disposition, 68-102 moderate, and more than 102 indicates a strong overall disposition toward critical thinking. It took about ten minutes to finish.

Data Collection Procedures

The data were collected according to the following procedures. Firstly, the questionnaire of sociodemographic information and the items in the CHCTDS were all set up online on a widely

used investigation tool in China called Wenjuanxing. As it is smartphone-based, first-year students who volunteered to participate in the study could fill in the questionnaires easily by clicking the link shared by the researchers on the smartphone. In addition to the questionnaire items, consent forms were gained online using a participant information sheet that clarified the goals of the study and assured participants of the confidentiality of their data. Data were then downloaded for analysis, and only the researchers had access to them.

Data Analysis

SPSS 23.0 and Amos 25.0 were employed in this study to analyze the data gathered online. As the data were collected online and participants could only submit the questionnaires when all the items were finished, there was no missing data. Before analyzing the data to find out answers to the aforementioned questions of the current study, error checking, and descriptive statistics were conducted. The first research question in the present study was to assess the reliability and validity of the newly proposed CHCTDS. To this end, Cronbach's alpha was used to evaluate the internal-consistency reliability of each scale, and EFA as well as CFA were performed using SPSS 23.0 and Amos 25.0 to examine the construct validity of the measurement. For the second research question, Pearson's bivariate correlation analysis was performed to probe whether foreign language learners' CT disposition was significantly correlated with their foreign language proficiency. To find answers to the third research question, multiple linear regression analysis was performed to explore how well the participants' CT disposition could predict their foreign language performance. Lastly, one-way ANOVA was conducted to address the last research question in the study to find out whether there were differences in foreign language proficiency among learners performing differently in their CT disposition.

Results

Descriptive Information of the Participants

According to Table one, we can see that the average age of the participants in this study was 18.32 (SD= .891), and their mean NMET score was 121.22 (SD= 15.17, Min= 67, Max=145). The participant's total score of the CHCTDS ranged from 58 to 116, with a mean score of 89.77 (SD= 10.67). The participants were classified into three CT disposition levels (high, moderate, and low) based on their total score in the CHCTDS. The distribution of each group was 3.6 % (n=14) in the low level, 85.9% (n= 336) moderate level, and 10.5% (n= 41) high level, which suggested that most of the Chinese foreign language learners in this study indicated a strong tendency to think critically. Detailed information on participants' characteristics was displayed in Table one.

Table 1. *Descriptive information of the participants (n= 391)*

Variable	N	%	M	SD	Min	Max
Gender						
Female	330	84.4%				
Male	61	15.6%				
Age (years)			18.32	.891	16	23
NMET score			121.22	15.17	67	145
CT Disposition						

Total score			89.77	10.67	58	116
Low level (Group 1)	14	3.6%				
Moderate level (Group 2)	336	85.9%				
High level (Group 3)	41	10.5%				
CT disposition construct						
Open-mindedness			22.28	3.33	13	28
Perseverance			15.62	2.03	8	21
Reflectiveness			16.08	2.35	8	21
Inquisitiveness			20.33	3.01	11	28
Self-confidence			15.46	2.58	6	21

The Reliability and Validity of the CHCTDS

As Table two showed, the reliability of the overall CHCTDS was considered very good for the total scale ($\alpha = .91$), and acceptable for its five sub-scales (ranging from .69 ~ .83) as well, indicating that the CHCTDS utilized to assess foreign language learners' critical thinking (CT) disposition in this study had a very good internal consistency. Moreover, each of the five subscales was moderately correlated to each other, and highly related to the overall scale, suggesting good internal consistency (Hair, Black, Babin, & Anderson, 2010) (see Table six).

Table 2. *Reliability analysis for the CHCTDS and its sub-scales (n= 391)*

Variable	*k*	*M*	*SD*	Cronbach's Alpha	95% CI
Overall CHCTDS	17	89.77	10.67	.91	[.896 .922]
Sub-scales					
Open-mindedness	4	22.28	3.33	.83	[.801 .856]
Perseverance	3	15.62	2.03	.69	[.634 .740]
Reflectiveness	3	16.08	2.35	.72	[.662 .761]
Inquisitiveness	4	20.33	3.01	.74	[.694 .779]
Self-confidence	3	15.46	2.58	.81	[.779 .844]

Note: CHCTDS= the Chinese Critical Thinking Disposition scale; *k*= number of items; *SD* = standard deviation; *M* = mean; 95% CI = 95% confidence intervals of coefficient alphas.

Concerning the construct validity, the Exploratory Factor Analysis (EFA) was performed first on the 17 items employing the Principal Component Analysis with varimax rotation. According to Table Three, we could see that the CHCTDS was suitable for EFA with a KMO value of .934, and the evaluation of Bartlett's Test of Sphericity was significant ($p < 0.001$) (see Table three).

Table 3. *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin measure of sampling adequacy		0.934
	Approx. Chi-Square	2635.470
Bartlett's test of sphericity	df	136
	Sig.	0.000

As Table four displayed, the results of the EFA revealed a five-factor solution, with items one, four, six, and 11 loading on Factor one (labeled as open-mindedness), items three, eight, 13, and 15 on Factor two (labeled as inquisitiveness), items two, seven, and 14 on Factor three (labeled as self-confidence), items nine, 12, and 17 on Factor four (labeled as reflectiveness), and items five, 10, 16 on Factor five (labeled as perseverance). The cumulative variance of the five-factor structure CHCTDS with 17 items contributed to 65.129% of the overall scale variance, meeting the standard of > 60%, and the commonalities (from .546 to .793) were sufficiently high (Hair et al., 2010).

Table 4. *The results of Exploratory Factor Analysis*

Rotated component matrix [a]

Item	Factor					Communality
	1	2	3	4	5	
Item 4	.754					.680
Item 11	.744					.672
Item 1	.736					.658
Item 6	.694					.644
Item 3		.696				.653
Item 15		.649				.672
Item 8		.636				.546
Item 13		.611				.581
Item 14			.796			.793
Item 2			.696			.733
Item 7			.648			.690
Item 9				.720		.631
Item 12				.697		.677
Item 17				.586		.557
Item 5					.717	.667
Item 16					.663	.582
Item 10					.655	.557
Eigenvalues	6.985	1.342	1.104	.836	.804	/
Present variance	16.557	13.292	12.035	11.658	11.587	/
Cumulative (%)	16.557	29.849	41.884	53.542	65.129	/

[a] Rotation converged in 8 iterations.

Subsequently, a one-factor Confirmatory Factor Analysis (CFA) was conducted employing the robust maximum likelihood estimator (ML) to validate the scale. The results revealed that all

standardized factor loadings were significant at $p < .001$ and above the cutoff criterion of .50 (Hair et al., 2010; Worthington & Whittaker, 2006). Moreover, the inspection of modification indices indicated a satisfactory model fit for the data: $\chi^2/df = 1.432$, NFI= .942, CFI= .981, TLI= .977, IFI= .982, RMSEA= .033, [90% CI: .021 ~ .045] (Kline, 2015) (see Table five).

Table 5. *Confirmatory factor analysis model fit results for the CHCTDS (n=391)*

Model	χ^2	df	χ^2/df	NFI	IFI	CFI	TLI	RMSEA [90% CI]
Cut value	/	/	< 4	> .90	> .90	> .90	> .90	< .80
CHCTDS Model	156.094*	109	1.432	.942	.982	.981	.977	.033 [.021 ~ .045]

Note: χ^2= Chi-square; df = degrees of freedom; NFI= Bentler-Bonett Normed Fit Index; IFI= Incremental Fit Index; CFI = comparative fit index; TLI= Tucker-Lewis index; RMSEA = root mean square error of approximation; 90 % CI = 90 % confidence interval; * p < .05.

Correlational Relationships between Critical Thinking Disposition and Foreign Language Proficiency

Pearson correlations between foreign language learners' NMET score, overall score of critical thinking (CT) disposition, and its five sub-scales were reported in Table six. It was found that there were statistically significant positive correlations between NMET score and overall CT disposition (r= .638) as well as its five sub-scales: open-mindedness (r= .531), self-confidence (r= .501), inquisitiveness (r= .506), perseverance (r= .473), and reflectiveness (r= .540), all the p values < 0.01.

Table 6. *Pearson correlations among NMET, overall critical thinking disposition, and its five sub-scales*

	1	2	3	4	5	6	7
1.Open-mindedness	-						
2.Self-confidence	.575**	-					
3.Inquisitiveness	.523**	.643**	-				
4.Perseverance	.498**	.543**	.572**	-			
5.Reflectiveness	.591**	.500**	.493**	.574**	-		
6.Overall CTD	.823**	.816*	.818**	.764**	.773**	-	
7.NMET	.531**	.501**	.506**	.473**	.540**	.638**	-

Note: **. Correlation is significant at the 0.01 level (2-tailed); CTD= critical thinking disposition; Open-mindedness, self-confidence, inquisitiveness, perseverance, and reflectiveness are the five sub-scales of CTD.

Predictability of Critical Thinking Disposition for Foreign Language Proficiency

To further identify how well the variables of critical thinking (CT) disposition could predict foreign language proficiency, multiple linear regression analysis was conducted. As Table seven revealed, five constructs of CT disposition explained 40.5% of the variance (F= 54.19, p< 0.0001) in foreign language proficiency. Open-mindedness (P< .001), self-confidence (P< .05), reflectiveness (P< .001), and inquisitiveness (P< .01) emerged as significant positive predictors in the model, with reflectiveness and open-mindedness showing the strongest positive predictability according to the raw (B) and standardized (β) coefficients. But perseverance didn't emerge as a significant predictor of foreign language proficiency in the current study. The beta and confidence intervals for the predictors of CT were presented in Table seven.

Table 7. *Regression analysis summary for variables predicting foreign language proficiency* [a]

Variable	B [95 %CI]	SE	β	t	VIF
Open-mindedness	.89 [.11, 1.37]	.24	.20 ***	3.65	1.88
Self-confidence	.72 [.068, 1.36]	.33	.12*	2.17	2.06
Inquisitiveness	.83 [.28, 1.37]	.28	.16**	2.96	2.01
Perseverance	.60 [-.19, 1.38]	.40	.080	1.50	1.86
Reflectiveness	1.53 [.85, 2.21]	.34	.24***	4.44	1.86
R^2/*F*			.405/54.19***		

Notes: [a.] Dependent Variable: NMET score; R^2= adjusted R square; 95 % CI = 95 % confidence interval; *p < .05. **p < .01. ***p < .001.

The Differences in Foreign Language Proficiency among Critical Thinking Disposition of Various Levels

Due to the significant *F* ratio in an analysis of variance, A Welch ANOVA with the Tamhane post hoc test (Wu, 2001) was adopted to examine differences in foreign language proficiency across three critical thinking (CT) disposition groups. The results of one-way ANOVA indicated foreign language learners of various levels of CT disposition showed significant differences in their foreign language proficiency (Welch *F*= 44.81, *p*= .000). To be specific, Tamhane post hoc tests revealed significantly higher NMET scores in the group with a higher level of CT disposition compared with both the moderate level and low-level group, and learners with a moderate level of CT disposition displayed higher score in NMET than those in the low-level group (see Table eight).

Table 8. *ANOVA and post hoc analysis of critical thinking disposition on foreign language proficiency*

	Group(M±SD)			Welch *F*	*P*	Post hoc
	Low level (*n*=14)	Moderate level (*n*=336)	High level (*n*=41)			
NMET	-2.32±1.31	0.00±0.86	0.77±0.68	44.81	0.000**	High level> Moderate level > Low level

Notes: NMET= National Matriculation English Test; ** *p*<0.01.

To sum up, the findings of the study indicated that CHCTDS was a valid and reliable scale. CT disposition was positively associated with learners' foreign language proficiency. Foreign language learners performing differently in CT disposition displayed significant differences in their foreign language proficiency. Moreover, four dispositional traits: open-mindedness, reflectiveness, inquisitiveness, and self-confidence toward CT were significantly positive predictors of learners' foreign language proficiency in the Chinese context.

Discussion

The current study examined the validity and reliability of the construct of a scale targeted at measuring foreign language learners' Critical Thinking (CT) disposition in the Chinese language based on a sample of 391 Chinese foreign language learners. The results for the first research question suggested that the CHCTDS was a psychometrically sound tool, with an alpha coefficient (α= .91) for the overall scale and the reliability of five sub-scales in the range of .69-.83 as measured by Cronbach's alpha. The correlations among the five CT disposition factors, labeled as open-mindedness, self-confidence, inquisitiveness, perseverance, and reflectiveness, were medium in size, with the correlations ranging from .493 to .643; the correlation between the overall scale and

its five sub-scales was stronger, in the range of .773-.823. Furthermore, the robust internal structure of the scale was evidenced by the EFA and CFA results. That is to say, psychometric analyses in this study confirmed that the CHCTDS was a reliable and valid measurement for assessing foreign language learners' CT disposition in Chinese. Open-mindedness, self-confidence, inquisitiveness, perseverance, and reflectiveness verified as the vital compositions of CT disposition in this study are the dimensions that gained consensus among researchers (e.g., Dwyer et al., 2017; Ennis, 1996; Facione & Facione, 1992; Quinn et al., 2020)

This study also probed how foreign language learners' CT disposition would correlate to and predict their foreign language proficiency. An essential finding of this study was that general CT disposition was positively associated with general foreign language proficiency (r= .638) and could significantly predict it, which echoes the previous findings of CT disposition's role in different language skills (Ünaldı & Yüce, 2021). Moderate correlations also existed among the five sub-scales (open-mindedness, self-confidence, inquisitiveness, perseverance, and reflectiveness) and foreign language proficiency. Furthermore, our study provided support that there were significant differences in foreign language proficiency among learners performing differently in CT disposition. Learners with better performance in CT disposition would enjoy a higher possibility of success in foreign language learning. Moreover, the significantly positive beta weight displayed in Table seven indicated that increases in open-mindedness, self-confidence, inquisitiveness, and reflectiveness, four of the five factors of CT disposition, could increase their foreign language proficiency. In other words, foreign language learners who possess these dispositional traits toward CT tend to perform better in foreign language study than those lacking. The contribution of self-confidence and perseverance to foreign language development was in line with past studies (e.g., Clément et al., 1994; Ozdemir & Papi, 2021; Pawlak et al., 2022; Teimouri et al., 2020), and the positive influence of inquisitiveness (e.g., Tang et al., 2019), open-mindedness (e.g., Jackson, 2016), and reflectiveness (e.g., Reeve, 2009; Wijnands et al., 2022) found on school achievement has also displayed in foreign language achievement in this study.

However, it is interesting to note that the findings of the correlation analysis and one-way ANOVA indicated that perseverance was significantly positively correlated with foreign language proficiency. Unexpectedly, it did not show significant predictability of proficiency in a foreign language, which is not consistent with the findings of Teimouri et al. (2020). The reason could be attributed to the neglect of considering language anxiety in the current study, which could exert negative influences on language learning (Teimouri et al., 2020). Moreover, the difference between foreign and second language learning could be another explanation because Teimouri et al. (2020) conducted their research among second language learners while our study was examined in a foreign language context. Second language learners with perseverance or maintaining efforts in second language learning could gain a higher degree of exposure to opportunities to communicate and apply what they have learned in various circumstances (Ringbom, 1980). They enjoy a much more immersive learning environment than foreign language learners, which could result in a more significant influence of perseverance on language development in a second language context.

The findings in the current study provide significant pedagogical implications for cultivating foreign language learners' CT disposition to enhance their language development in foreign language classrooms. Considering the positive correlations of open-mindedness with foreign language learning, it is suggested that teachers create an open-up atmosphere to facilitate students being more open to new experiences, exotic cultures, or language forms in the classroom

(Wucherer & Reiterer, 2016). Besides, boosting foreign language learners' curiosity and self-confidence, which could promote their knowledge-building and involvement in class activities, is beneficial to their foreign language development as well. Moreover, learners should not be passive participants in class but be driven by personal reflection and interests in the hope of achieving ultimate proficiency (Ushioda, 2008). Therefore, teachers need to provide foreign language learners with sufficient space to think about language by themselves and the necessity to formulate reflective questions in class to nurture their reflective personalities. The findings of the current study give weight to the above arguments. Regarding theoretical implications, the present study contributes to improving language pedagogy. The results of the present study would help educational officials increase their awareness and understanding of the pivotal role of cultivating foreign language learners' CT disposition so that they would devise educational programs and policies to assist students in fostering their disposition to think critically. Additionally, it would benefit material and textbook developers in developing materials and textbooks in line with the purpose to boost foreign language learners' disposition toward CT, thus enhancing their foreign language development.

However, although our study represents one of the preliminary attempts to examine their associations, several limitations in the present study must be identified for future research. To begin with, all the samples are recruited from foreign language learners in China and may not be representative enough of foreign language learners across other countries. Secondly, there was an asymmetrical gender distribution between men and women in this study, with about 84.4% of the participants being female. Thirdly, this is only a cross-sectional study, and a longitudinal investigation may be needed to further confirm the results.

Conclusion

The current research reported herein targets to bridge a significant research gap by probing the validity and reliability of the newly developed Chinese scale of critical thinking (CT) disposition, and the effects of CT disposition on foreign language proficiency. Returning to the first research questions of this study, we conclude that the CHCTDS is a sound instrument for measuring foreign language learners' CT disposition in Chinese. To summarize the results of the exploration of the impacts of CT disposition on foreign language learning in the Chinese context with correlational analysis, five dimensions of CT disposition (open-mindedness, reflectiveness, perseverance, inquisitiveness, and self-confidence) indicated significantly positive correlations with foreign language proficiency. The results of the one-way ANOVA revealed that there were significant differences in foreign language proficiency among learners with different levels of CT disposition. Furthermore, regression analysis showed that only four CT dispositions, including open-mindedness, reflectiveness, inquisitiveness, and self-confidence, significantly predicted learners' foreign language proficiency in this study. Overall, the findings of the study suggested that CT disposition could be an essential factor exerting a significantly positive influence on foreign language learning. To gain a deeper understanding of the effects of CT disposition on foreign language learning, longitudinal investigations in a mix-method design by adopting multiple methods such as interviews and questionnaires are recommended in future studies. Empirical studies conducted among participants from various regions and countries in the world would also be necessary for verifying the cross-cultural replicability of our findings.

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