

Exploring the Impact of Test Anxiety on Chinese-to-English Translation Performance through the Lens of CAF

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Abstract: Test anxiety refers to a psychological state of excessive worry, confusion, and nervousness that individuals experience when facing evaluative situations. While moderate anxiety can stimulate students' enthusiasm, excessive anxiety can have a severe impact on their cognitive abilities and academic performance. Numerous studies have demonstrated that anxiety significantly affects the cognitive processing of second languages, particularly in contexts requiring accurate and fluent communication across different languages. Therefore, this study aims to investigate how test anxiety influences the performance of second language learners in translation, an example of complex cognitive activities. This research involved 95 junior students majoring in English. Data collection took place after the final exam for Chinese-English translation courses. The students' test anxiety levels were measured using Spielberger's Test Anxiety Inventory (TAI), and their translation performance was evaluated based on complexity, accuracy, and fluency (CAF). The study findings revealed that test anxiety was widespread among participants, with nearly half exhibiting high levels of test anxiety. Moreover, test anxiety significantly impacted translation performance: the complexity and accuracy of translation tasks were notably affected by the degree of test anxiety and particularly the cognitive component, indicating that higher levels of test anxiety could result in lower complexity and accuracy in translation performance. This outcome confirmed that test anxiety could diminish students' cognitive processing abilities and translation quality. However, the study did not find a significant correlation between test anxiety and translation fluency, suggesting that test anxiety might have a relatively minor impact on translation fluency.

Keywords: Test Anxiety; Chinese-to-English Translation; Complexity; Accuracy; Fluency Introduction.

1. Introduction

Test anxiety is a prevalent and impactful phenomenon that significantly impacts individuals in diverse educational settings. It encompasses the experience of overwhelming worry, fear, or nervousness before, during, or after an assessment, eliciting various cognitive, emotional, and physiological responses. This affective factor in education has garnered attention for its profound influence on learning outcomes, academic performance, and overall well-being, as evidenced by extensive research [41,70,52,64,10]. Notably, the impact of test anxiety is particularly pronounced in second language acquisition, a domain where learners are frequently tasked with demonstrating their linguistic and cognitive abilities under pressure, such as in translation tasks. Research indicates that anxiety significantly affects cognitive processing in a second language, and its influence is expected to be more prominent in situations requiring accurate and fluent translation between languages [63]. Thus, investigating the impact of test anxiety on L2 learners' performance in cognitively demanding language tasks, such as translation, can provide valuable insights into the effects of anxiety in this context.

Despite the substantial body of literature on test anxiety, bilingual translation has received relatively limited attention compared to its effects on other aspects of language learning. This research gap forms the basis for the present study, which seeks to specifically investigate the influence of test anxiety on Chinese-to-English translation, a type of L2 task. By examining the potential impact of test anxiety on L2 learners' performance in translation tasks, considering the dimensions of complexity, accuracy, and fluency, this study aims to

provide a comprehensive understanding of how affective factors manifest in cognitively demanding language tasks.

Furthermore, the practical implications of this study are noteworthy for language educators and curriculum designers. By shedding light on the influence of test anxiety on L2 learners' performance in bilingual translation and identifying the contributing factors of test anxiety, this research can inform the development of targeted interventions and support mechanisms in the field of second language acquisition. The findings are expected to guide the design of instructional strategies and interventions aimed at helping learners manage test anxiety and optimize their performance in bilingual translation tasks.

2. Literature Review

Scholars have conducted extensive research on anxiety and its implications in diverse fields. This chapter encompasses the definition of test anxiety, studies on test anxiety and the evaluation by CAF.

2.1. Studies on Test Anxiety

2.1.1. Definition of Test Anxiety

Currently, there is no unified definition of test anxiety (TA) both domestically and internationally. Researchers have defined test anxiety from various perspectives. In the 1930s, scholars such as Brown [6], Luria [33], and Neumann [38] first established test anxiety as a psychological phenomenon. Later, Alpert & Haber [3], Mandler [35] and Wolpe [67] viewed test anxiety as an emotional response under specific conditions. Sieber [65] and others approached test anxiety from observable external behavior, seeing it as a physiological and behavioral response arising from worry

about potential failure or negative outcomes in testing or similar evaluative situations. Liebert et al. [30] conducted factor analysis of test anxiety, indicating it was comprised of two components: worry and emotionality. Worry primarily concerned the evaluation and anticipation of exams, including cognitive aspects, while emotionality referred to bodily reactions such as palpitations and tension related to autonomic nervous system dysregulation. Based on it, Spielberger [57] proposed a widely accepted definition, considering test anxiety as a context-specific personality trait. "Test anxiety" could also refer to the stressful evaluative stimuli and environmental factors, as well as the fluctuating anxiety states experienced in the exam context [61]. Chinese scholars Yang [68] and Peng [42] provided similar definitions, regarding test anxiety as a complex emotional phenomenon characterized by basic features of worry, tension, or concern in response to specific test situation stimuli. While these scholars offered varying definitions of test anxiety, they all aimed to define test anxiety by encompassing its fundamental components. In this study, test anxiety is defined as a complex psychological phenomenon characterized by worry and some bodily reactions in response to specific test situations.

2.1.2. Studies on Effects of Test Anxiety

Studies on the effects of test anxiety have been popular among scholars in general education as well as in foreign language education, but have reported conflicting results [22,19,62,63]. These effects could either be facilitative or debilitating.

Kader [25] suggested that anxiety about an upcoming examination could lead to higher motivation, focus, effort, and ultimately result in improved grades. Kahan [26] found that moderate test anxiety was associated with the best academic performance, suggesting that moderate anxiety levels could promote diligence and responsibility for achieving success in life. However, there is currently no systematic research on the positive effects of test anxiety. Besides, the Yerkes-Dodson Law posits an inverted U-shaped relationship between arousal and performance [13]. Moreover, many researchers viewed test anxiety as a psychological issue that requires treatment and intervention. They acknowledged that test anxiety could have detrimental effects on individuals' cognitive processes, mental health, and physical well-being [9,10,15,54]. For instance, test anxiety could impede information processing [59], disrupt attention span and working memory [20,65], and lead to the forgetting of crucial content [56]. Von der Embse and Witmer [64] further reinforced the negative relationship between test anxiety and test performance, highlighting that higher levels of test anxiety were consistently associated with lower test performance.

All in all, the assumption that test anxiety could disrupt normal cognitive functioning has become a cornerstone in subsequent research on test anxiety. Building upon this premise, this study aims to explore how test anxiety influences performance in Chinese-to-English translation tests. Furthermore, most studies examining the relationship between test anxiety and performance focus on the overall impact of test anxiety, resulting in an incomplete understanding of the specific effects of anxiety on performance. This study aims to bridge this research gap by delving into the effects of specific manifestations of test anxiety on performance.

2.1.3. Measurement of Test Anxiety

As research on test anxiety has evolved, researchers have

endeavored to discover effective methods for diagnosing and measuring this condition. Consequently, various measurements for test anxiety have been developed.

Mandler and Seymour Sarason [35] developed the first acceptable self-report Test Anxiety Questionnaire (TAQ). This 37-item scale inquired about symptoms of anxiety experienced by examinees under major academic evaluative situations. Based on the TAQ, Irwin G. Sarason [46] developed the Test Anxiety Scale (TAS). But different from the TAQ, the TAS was a unidimensional scale that focused more on the individual's experience during exams rather than the exam situation itself. It has been highly regarded by researchers for its ability to differentiate individuals with varying levels of test anxiety effectively and has been widely utilized in research studies. Subsequently, several other scales focused on individuals were developed, including Perten and Haber's [3] Achievement Anxiety Test (AAT).

Later, researchers developed new test anxiety scales that delved into different aspects of test anxiety. For example, Sarason's [47] Reactions to Tests scale (RTT) measured test anxiety from four dimensions: Worry, Tension, Test-Irrelevant Thinking, and Bodily Symptoms. Spielberger [57] developed the Test Anxiety Inventory (TAI), which contained two subscales for measuring "Worry" and "Emotionality". According to Chapell et al. [11], the TAI was considered the most significant and widely utilized tool for evaluating test anxiety among high school and college students.

The Achievement Anxiety Test (AAT) primarily measured the functional aspect of test anxiety, but failed to capture its underlying essence. On the other hand, the Test Anxiety Behavior Scale (TABS) only measured anxiety from a single dimension, and although the Reactions to Tests scale (RTT) attempted to measure anxiety from multiple dimensions, conclusions were still limited by the cognitive and physiological two-dimensional model. Therefore, for this study, the Test Anxiety Inventory (TAI) was adopted as it could provide a more comprehensive assessment of test anxiety from two major dimensions.

2.2. Studies on Complexity, Accuracy, Fluency (CAF)

2.2.1. Development of CAF

The field of second language acquisition emerged as an independent area of study during the early 1970s. At that time, researchers sought methods to gauge learners' progress in acquiring a second language, which can be divided into two main strands. The first approach drew from studies on first language acquisition, where mean length of utterance was an established index of development [24,7]. However, this approach faced challenges due to the varied influence of an individual's first language on the process of acquiring a second language. The second approach focused on classroom instruction and differentiated between fluency-oriented and accuracy-oriented activities [8]. In 1989, Skehan [53] introduced the concept of complexity and advocated for the utilization of three dimensions -- Complexity, Accuracy, and Fluency (CAF) -- to assess second language learners' linguistic production. Two years later, Skehan [54] formally divided language production into these three dimensions.

The notions of complexity, accuracy, and fluency (CAF) have been employed in a number of studies on the acquisition and use of a second language though they do not constitute a theory or a research program in themselves. They are dimensions for describing language performance, most

frequently used as dependent variables to assess variation with respect to independent variables such as acquisitional level or task features. Both theoretically and empirically, CAF has been validated as the most effective tool for measuring language development levels.

From the mid-1990s onwards, inspired by advancements in cognitive psychology and psycholinguistics [4, 29], CAF has also been increasingly figured as the independent variables of investigation in SLA. Numerous studies have explored its role in understanding the acquisition, representation, and processing of L2 knowledge [14,23,61,27]. For instance, Guillot [23] explored the role of complexity, accuracy, and fluency in the assessment of second-language writing, discussing their importance in evaluating language proficiency, and Towell [61] examined the role in the assessment of second-language speaking. Larsen-Freeman [27] examined the oral and written production of five Chinese learners of English and found that complexity, fluency, and accuracy showed different patterns of development in their language production. The theoretical foundations of CAF are firmly rooted in second language acquisition research, with Ellis [14] emphasizing the role of explicit instruction in shaping learners' linguistic output, supporting the use of CAF as a framework for analyzing language production.

Nonetheless, the study on second language tasks with CAF as measurement has predominantly focused on writing and speaking. Translation, a subcategory within second language studies, has been relatively under-reported in CAF research. To address this gap, the present study seeks to expand the scope of CAF by adopting it in assessing the performance of English as a Foreign Language (EFL) students specifically engaged in Chinese-to-English translation tasks. By utilizing CAF in this context, valuable insights can also be gained into the efficacy of CAF in second language education.

2.2.2. Factors Influencing CAF

Identifying the factors that influence CAF has been of paramount importance for second language researchers and educators. Some factors affect the manifestation of CAF at a specific point in time, while others play a significant role in its longitudinal development. These factors are diverse and encompass both internal linguistic factors and external variables, as identified by Housen, Kuiken, and Vedder [23]. Internal linguistic factors refer to specific language phenomena or features that may impact CAF due to their unique properties, such as relative clauses. External factors include individual learner differences (such as anxiety, engagement, and aptitude), pedagogical interventions (e.g., feedback), and other environmental factors [23].

For example, Fazilatfar et al. [18] found that focused written feedback significantly enhanced syntactic complexity and reduced errors in advanced learners. Furthermore, anxiety-related factors, such as foreign language anxiety, have been linked to reduced willingness to communicate [40], highlighting the interplay between affective variables and language performance. Much of the research on factors influencing CAF focuses on task repetition, task complexity, and learners' language proficiency [2,24,21,36]. Despite the extensive research on individual differences, particularly anxiety, and the increasing trend toward adopting a more comprehensive perspective, no studies have yet applied anxiety as an explanatory framework for the complexity, accuracy, and fluency of translation tasks. This gap highlights the need for further exploration into the role of individual differences in shaping the cognitive processes involved in

translation, potentially leading to more effective pedagogical strategies in second language education.

2.3. Significance of This Study

Previous studies have demonstrated a negative correlation between test anxiety and test performance across different educational levels, highlighting its detrimental effects on academic achievement. While existing research has established a general understanding of the impact of test anxiety on performance, there is a gap in understanding the specific manifestations of anxiety and their effects on performance. On the other hand, to evaluate the performance, the concept of Complexity, Accuracy, and Fluency (CAF) has been utilized in numerous studies on second language acquisition. However, CAF has been predominantly applied in writing and speaking tasks. There is a lack of research applying CAF to translation tasks. What's more, while the influence of pedagogical interventions and other environmental factors on CAF have been extensively explored, individual differences, anxiety in particular, have not been thoroughly investigated.

This research aims to delve into the specific manifestations of test anxiety and its underlying components. With the Chinese-to-English translation test as a focal point, this research aims to gain a more comprehensive understanding of its impact on translation, a demanding cognitive task in second language acquisition. Besides, the Chinese-to-English translation test also serves as a means to provide valuable insights into the efficacy of CAF and expand its application to translation tasks. Furthermore, the research emphasizes the importance of further exploring test anxiety, a factor of individual differences, and its impact on the development of the second language, specifically measured by CAF. Ultimately, the findings of this study aim to contribute to the development of more effective pedagogical practices in second language education.

3. Research Design

3.1. Research Questions

Understanding the impact of test anxiety on language learners' performance in translation tasks is crucial for effective language teaching and learning. Investigating learners' test anxiety levels offers insights into the challenges they face during language learning assessments. Additionally, studying the impact of test anxiety on complexity, accuracy, and fluency (CAF) allows for a deeper comprehension of how it influences learners' performance in translation tasks. This research aims to shed light on the relationship between test anxiety and translation performance, providing valuable insights for educators to develop targeted teaching strategies to alleviate anxiety and enhance learners' translation abilities.

Therefore, current study is designed to answer the following questions:

- (1) What is the overall situation of test anxiety of participants?
- (2) What is the impact of test anxiety on the performance, specifically complexity, accuracy and fluency in the Chinese-to-English translation task?

3.2. Participants

In this research, questionnaires were sent to 95 junior students who majored in English in a university. Students with professional English learning backgrounds were chosen to

participate in the experiment. Participants with invalid results and with special learning backgrounds (e.g. overseas students) were eliminated. As a result, there were 95 efficient participants. All of them have studied in the same translation courses and similar training backgrounds for 2 terms, and have taken the translation test. In this way, the experiment has tried as much as possible to rule out the influence of other variances brought by different learning and training environments.

3.3. Instruments

3.3.1. Test Anxiety Inventory

The Test Anxiety Inventory (TAI) developed by Spielberger [57] in 1980 (See Appendix) provides two subscale scores, “worry” and “emotionality”, each consisting of eight items. Items 1, 3, 6, 8, 12, 14, 16, and 17 are categorized under “worry”, while items 2, 4, 7, 9, 10, 11, 13, and 18 fall under “emotionality”. In addition to these subscales, the TAI also offers a total score calculated from all 20 items, with four items excluded from the subscale calculations. The TAI demonstrates strong test-retest reliability ($r = .80$) over short intervals ranging from two to four weeks among high school, undergraduate, and graduate students.

Based on 4-Likert scale, the research participants were asked to report how frequently they experience the specific symptoms of test anxiety: 1=almost never, 2=sometimes, 3=often, 4=almost always. The lowest possible score is 20 points, and the highest is 80 points. For the specific subscales of “worry” and “emotionality”, the highest possible scores are 32 points, whereas the lowest possible scores are 8 points.

3.3.2. CAF

Second language performance is in essence a complex construct comprising multiple components, and the CAF dimensions are thought to be able to reflect the quality of its main aspects [66]. In this study, the CAF dimensions were utilized to assess L2 performance comprehensively.

3.3.2.1. Measures of Complexity

Complexity is commonly analyzed through two dimensions: syntactic complexity and lexical complexity [66]. The measures for these dimensions are introduced separately.

Based on the studies conducted by Ortega [39, 50] and Wolfe-Quintero et al. [66], Lu [71] developed a Second Language Syntax Complexity Analyzer (L2SCA) that included 14 measurement indicators across 5 dimensions. This measurement system is comprehensive and systematic, and has been widely used in empirical research related to English. Because of the program’s analytical effectiveness, it has been incorporated in many studies [2]. In this study, L2SCA was employed to gauge syntactic complexity. Several indices were chosen based on Norris and Ortega’s [72] organic analysis of CAF and Lu’s [31,32] detailed suggestions: the mean length of clause (MLC), clauses per T-unit (C/T), dependent clauses divided by the total number of clauses (DC/C), and dependent clauses divided by the total number of T-unit (DC/T).

Lexical complexity was further specified by considering both the variety and sophistication of vocabulary. In earlier studies on language proficiency, researchers utilized TTR (type/token ratio) to distinguish lexical diversity, which was acknowledged as a significant element in assessing vocabulary richness in L2 evaluation [73]. However, this measure faced criticism due to its heavy dependence on text

length [74], which means that the ratio tends to decrease with longer texts. In response to this limitation, more refined measures were developed, among which the mean segmental type-token ratio (MSTTR) emerged as prominent and widely utilized [e.g., 69, 75, 57]. The MSTTR value is positively associated with the degree of lexical complexity, which means that a high MSTTR value indicates a higher level of lexical complexity. In this study, MSTTR was adopted and it can be calculated by an online computer program called Lexical Complexity Analyzer.

3.3.2.2. Measures of Accuracy

Accuracy seems to be the most transparent construct in the CAF triad, and it refers to target-like-use of language, i.e., error-free speech or writing [23,66]. Generally, there are two main perspectives for investigating the accuracy of a text. One approach focuses on specific aspects, examining learners’ performance in relation to a particular linguistic feature. Another approach takes a holistic perspective by considering the overall accuracy of the text. This involves calculating the total number of errors per T-unit (E/T), as well as the total number of error words per 100 words (Errors/100). These measures provide a comprehensive evaluation of the accuracy of text and have been commonly used in previous studies [17]. In order to gain a global picture of the learners’ language performance in accuracy, the second method was adopted in this study. The number of errors can be determined using tools like Grammarly and checked manually, the number of T-units can be obtained through the use of the L2 Syntactic Complexity Analyzer, and the E/T and the Errors /100 can be calculated manually.

3.3.2.3. Measures of Fluency

Table 1. CAF Measures

Variables		Measures
Complexity	Syntactic complexity	mean length of clause (MLC) clauses per T-unit (C/T) dependent clauses per clause (DC/C) dependent clauses per T-unit (DC/T)
	Lexical complexity	mean segmental TTR (MSTTR-50)
Accuracy		the total number of errors per T-unit (E/T) the total number of error words per 100 words (Errors/100)
Fluency		the total number of words per minute (W/M) the total number of words per T-unit (W/T)

Fluency refers to ‘the production of language in real time without undue pausing and hesitation’ [17]. For writing, however, measuring pauses and hesitations in writing is not as straightforward as it is in speaking. Nevertheless, it is evident that a writer who can write smoothly will generate more words within a specific timeframe. Hence, the total number of words per minute (W/M) metric was introduced for this purpose. Additionally, the total number of words per T-unit (W/T) ratio was utilized to enhance validity. This ratio measure, identified as one of the top three metrics, has been extensively used to assess learners’ language proficiency [66].

The eight CAF measures employed in this study to test the participants’ Chinese-to-English translation performance are summarized in Table 1.

3.4. Procedures

First, participants' data were collected using Spielberger's Test Anxiety Inventory. Questionnaires were administered online after the translation test. Participants had around 3 minutes to complete the questionnaire. Before completing the questionnaire, they were given assurances that the findings would be utilized for research purposes only. Besides, emphasis was placed on the confidentiality of the questionnaire, and thus they were encouraged to respond truthfully. Secondly, Chinese-to-English translation performance were obtained from course examination. Thus, information on test anxiety levels and translation performance was gathered. Finally, excel software was utilized to set up the database, and analyses were conducted by means of SPSS (Statistical Package for the Social Sciences) for Windows 26.0.

4. Results

4.1. Results of the Questionnaire

4.1.1. Reliability and Validity Testing of the Questionnaire

The questionnaire scale was analyzed using Cronbach's Alpha test, KMO test, and Bartlett's sphericity test in SPSS. The results revealed a high-reliability score of 0.898, indicating the data's strong consistency. Additionally, the validity score of 0.792 suggested that the data was reliable and suitable for further analysis.

Table 2. The Results of Reliability Analysis for TAI

Cronbach's Alpha	Item
0.898	20

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.792
Bartlett's Test of Sphericity	Approx. Chi-Square	623.660
	df	190.000
	Sig.	0.000

4.1.2. Overall Results of Test Anxiety

Descriptive statistics of test anxiety and its components were presented in Table 3. Among the 95 valid TAI scores of the total participants, the mean score was 48.59 (SD=8.278), which meant participants' test anxiety was generally at a higher or moderate level (Yue & Zhu, 2000). To further study the research participants' test anxiety, the questionnaire was divided into two dimensions, namely worry anxiety and emotional anxiety. According to the results shown in the above table, the mean score of Worry was 20.10 (SD=2.964) and the mean score of Emotionality was 19.25 (SD=3.786).

Table 4. Results of TAI

Measurement Index	N	Min	Max	Mean	SD
Total	95	25	64	48.59	8.278
Worry	95	12	27	20.10	2.964
Emotionality	95	9	27	19.25	3.786

4.2. Effects of Test Anxiety on Participants' Performance

Students' test anxiety, as measured by the TAI scale, can be

analyzed about their performance in translation tasks using correlation and regression analyses. The TAI scale consists of two subscales, Worry and Emotion, which respectively assess cognitive and emotional anxiety. To explore the correlation between test anxiety and performance, three perspectives can be considered: total test anxiety, emotional anxiety, and cognitive anxiety. The results of correlation analysis can provide initial insights into the relationships between these variables. Then, regression analyses are conducted to gain a more comprehensive understanding by predicting how variations in test anxiety impact performance outcomes. By examining the regression coefficients, we can determine the specific contributions of cognitive and emotional anxiety to students' test anxiety and performance.

4.2.1. Effects on Complexity

Complexity includes syntactic complexity and lexical complexity. Syntactic complexity was measured by MLC, C/T, DC/C and DC/T, and lexical complexity was reflected by MSTTR. In this part, Pearson correlation analysis and regression analysis were employed to explore the relationship between test anxiety and complexity.

From the results illustrated in Table 4.1, significant negative correlations existed between test anxiety and all complexity measures ($p < 0.001$). Among them, C/T exhibited the strongest correlations with test anxiety ($r = -0.613$, $p < 0.001$) while MLC demonstrated the weakest ($r = -0.468$, $p < 0.001$). Meanwhile, both two subscales of test anxiety were negatively correlated with these indices of complexity ($p < 0.001$).

Table 5. Correlation between Test Anxiety and Complexity

	MLC	C/T	DC/C	DC/T	MSTTR
Test Anxiety	-0.468**	-0.613**	-0.499**	-0.507**	-0.583**
Worry	-0.504**	-0.624**	-0.502**	-0.520**	-0.597**
Emotionality	-0.381**	-0.520**	-0.417**	-0.431**	-0.568**

Test anxiety was entered into a series of linear regression analyses to examine the amount of variance in complexity explained by Test anxiety. Separate regressions were conducted in relation to different indices (see Table 4.2.1-Table 4.2.5). The result showed that test anxiety was a significant predictor of indices of complexity ($p < 0.001$) and could explain 21.9%, 37.6%, 24.9%, 25.7% and 33.9% of the variance in MLC, C/T, DC/C, DC/T and MSTTR respectively. It suggested that test anxiety would have a negative impact on complexity, as the regression unstandardized coefficient value was -0.163, -0.018, -0.005, -0.009 and -0.002 respectively.

Table 6. Linear Regression Analyses Predicting Complexity (MLC) with Test Anxiety

	R ²	B	F ($p < 0.001$)
Test Anxiety	0.219	-0.163	F (1,93) = 26.084

Table 7. Linear Regression Analyses Predicting Complexity (C/T) with Test Anxiety

	R ²	B	F ($p < 0.001$)
Test Anxiety	0.376	-0.018	F (1,93) = 55.954

Table 8. Linear Regression Analyses Predicting Complexity (DC/C) with Test Anxiety

	R ²	B	F (p<0.001)
Test Anxiety	0.249	-0.005	F (1,93) = 30.797

Table 9. Linear Regression Analyses Predicting Complexity (DC/T) with Test Anxiety

	R ²	B	F (p<0.001)
Test Anxiety	0.257	-0.009	F (1,93) = 32.102

Table 10. Linear Regression Analyses Predicting Complexity (MSTTR) with Test Anxiety

	R ²	B	F (p<0.001)
Test Anxiety	0.339	-0.002	F (1,93) = 47.773

To understand the mechanism of test anxiety, its two components were entered simultaneously in multiple regression analyses, to explore which components were the best predictors of complexity. As seen from Table 4.3.1 to Table 4.3.5, worry emerged as the strongest predictor of all the complexity measures ($p < 0.001$), explaining 27.6%, 39.5%, 25.6%, 27.5% and 36.3% of the variance in MLC, C/T, DC/C, DC/T and MSTTR respectively, but emotionality did not ($p > 0.05$).

Table 11. Multiple Regression Analyses Predicting Complexity (MLC) with Worry and Emotionality

	B	R ²	F
Worry	-0.720	0.276	F (2,92) = 17.525, $p < 0.001$
Emotionality	0.270		$p > 0.05$

Table 12. Multiple Regression Analyses Predicting Complexity (C/T) with Worry and Emotionality

	B	R ²	F
Worry	-0.059	0.395	F (2,92) = 30.050, $p < 0.001$
Emotionality	0.012		$p > 0.05$

Table 13. Multiple Regression Analyses Predicting Complexity (DC/C) with Worry and Emotionality

	B	R ²	F
Worry	-0.017	0.256	F (2,92) = 15.818, $p < 0.001$
Emotionality	0.004		$p > 0.05$

Table 14. Multiple Regression Analyses Predicting Complexity (DC/T) with Worry and Emotionality

	B	R ²	F
Worry	-0.030	0.275	F (2,92) = 17.465, $p < 0.001$
Emotionality	0.006		$p > 0.05$

Table 15. Multiple Regression Analyses Predicting Complexity (MSTTR) with Worry and Emotionality

	B	R ²	F
Worry	-0.004	0.363	F (2,92) = 26.201, $p < 0.001$
Emotionality	-0.001		$p > 0.05$

Notes. ** represents $p < 0.001$; * represents $p < 0.05$. MLC = mean length of clause. C/T = Clauses per T-unit. DC/C = dependent clauses per clause. DC/T = dependent clauses per T-unit. MSTTR = the mean segmental type-to-token ratio.

4.2.2. Effects on Accuracy

The total number of errors per T-unit (E/T) and the total number of error words per 100 words (Errors/100) were calculated to assess accuracy. According to the results obtained by Pearson correlation analysis shown in Table 5.1, E/T exhibited significant positive correlations with overall test anxiety ($r = 0.594$, $p < 0.001$), worry ($r = 0.579$, $p < 0.001$) and emotionality ($r = 0.564$, $p < 0.001$). Similarly, there was a significant positive correlation between Errors/100 and test anxiety ($r = 0.753$, $p < 0.001$), worry ($r = 0.794$, $p < 0.001$), and emotionality ($r = 0.681$, $p < 0.001$).

Table 16. Correlation between Test Anxiety and Accuracy

	(E/T)	(Errors/100)
Test Anxiety	0.594**	0.499**
Worry	0.579**	0.526**
Emotionality	0.564**	0.410**

Forward regression analysis was carried out (See Table 5.2). The results showed that test anxiety was a significant predictor of indices of Accuracy ($p < 0.001$) and there was a significant positive impact of test anxiety on the variance ($\beta = 0.048$; $\beta = 0.249$). What's more, test anxiety accounted for 35.2% and 24.9% of the variance in E/T and Errors/100 respectively.

Table 17. Linear Regression Analyses Predicting Accuracy (E/T) with Test Anxiety

	R ²	B	F
Test Anxiety	0.352	0.048	F (1,93) = 50.581

Table 18. Linear Regression Analyses Predicting Accuracy (Errors/100) with Test Anxiety

	R ²	B	F
Test Anxiety	0.249	0.153	F (1,93) = 30.817

Also, two components were entered into multiple regression analysis. Again, worry predicted two indices of accuracy better ($p < 0.001$), explaining 34.7% and 29.2% of the variance in E/T and Errors/100 respectively.

Table 19. Multiple Regression Analyses Predicting Accuracy (E/T) with Worry and Emotionality

	B	R ²	F
Worry	0.078	0.347	F (2,92) = 24.450, $p < 0.001$
Emotionality	0.045		$p > 0.05$

Table 20. Multiple Regression Analyses Predicting Accuracy (Errors/100) with Worry and Emotionality

	B	R ²	F
Worry	0.617	0.292	F (2,92) = 18.963, p<0.001
Emotionality	-0.203		p>0.05

Notes. ** represents $p < 0.001$; * represents $p < 0.05$. E/T = errors per T-unit. Errors/100 = errors per 100 words.

4.2.3. Effects on Fluency

Two measures were employed to evaluate the level of fluency, i.e. W/M (the total number of words per minute) and W/T (the total number of words per T-unit). According to the results obtained by Pearson correlation analysis (see Table 6.1), test anxiety and fluency were not correlated ($p > 0.05$).

Table 21. Correlation between Test Anxiety and Fluency

	W/T	W/M
Test Anxiety	0.160	0.077
Worry	0.023	0.099
Emotionality	0.252	0.042

5. Discussion

This study makes a substantial contribution to our understanding of the effects of test anxiety on translation performance among English major students in China. With regard to the first research question concerning the overall situation of test anxiety, participants in our study reported moderate or even higher levels of test anxiety ($M = 48.59$, $SD = 8.278$). Besides, nearly half of the participants experienced high levels of test anxiety, which suggests that test anxiety is a prevalent issue among college students [48,51]. Such anxiety often stems from inadequate test preparation, deficiency in practice, discomfort with the testing situation or fear of failure [5,58,60]. Participants did not know the topic before the exam and could not do the pre-translation preparation well. Meanwhile, scores of the final test could influence their future educational achievement, which induces their test anxiety.

The second research question investigated the effects of test anxiety on the Chinese-to-English translation task performance evaluated by complexity, accuracy and fluency. First, concerning complexity, this study found a statistically significant negative relationship between test anxiety and some indices of complexity which aligned with previous research [12,37,28,59]. To be more specific, the study found that under high test anxiety, individuals tend to produce shorter and potentially less complex clauses, as well as fewer dependent clauses in their translation. Also, students would be susceptible to more restricted vocabulary and less varied language use when experiencing a high level of test anxiety during the Chinese-to-English translation task. Besides, test anxiety exhibited the strongest negative correlation with C/T and emerged as the most influential predictor of C/T among all complexity measures, as previous studies explained C/T, representing the number of subordinate structures, was a key feature distinguishing second-language learners from native speakers [1,34,36].

Second, as for accuracy, this study also found a statistically significant positive relationship between test anxiety and indices of accuracy. It suggested that as individuals experience higher test anxiety levels, they are inclined to make more errors in their translations, as evidenced by

increased E/T and Errors/100 ratios. These findings aligned with prior research, indicating that heightened test anxiety could significantly affect linguistic accuracy [63,62]. Additionally, both two indices of accuracy displayed a significant correlation with test anxiety and could be predicted by test anxiety, thereby strengthening the study's conclusion. Hence, test anxiety not only had a negative influence on the complexity but also on the precision of language production. However, in terms of fluency, there was no significant relationship between test anxiety and indices of fluency, which conflicted with findings from prior research [43]. This previous study posited that anxious translators tend to meticulously concentrate on the source text, leading them to spend more time completing translations compared to their non-anxious counterparts. Differences in measurement could explain some of the contradictory research findings, as the total exam duration was employed as the benchmark rather than the specific individual completion time. This methodological variance might have introduced minor discrepancies between the fluency indices measured and the actual performance circumstances of the participants. Nonetheless, the findings of the study supported the idea that fluency was more closely associated with control and automation, with anxiety exerting a less influence on it when compared with complexity and accuracy as highlighted in previous studies [23,55].

Furthermore, having delved into two components of test anxiety, the study found that the cognitive component (worry) exerted a greater influence on the performance of complexity and accuracy which aligned with the previous study [16,19,31,44]. Housen et al. [23] explained that complexity and accuracy were linked to a more elaborate and sophisticated L2 knowledge system related to representation and restructuring of the interlanguage, which necessitated greater cognitive processing. Studies by Hayes et al. [25] and Smith and Jones [71] also demonstrated that high levels of cognitive anxiety can lead to reduced cognitive flexibility and increased cognitive load. When individuals experience cognitive anxiety, their mental resources become strained, making it more challenging to engage in complex cognitive tasks such as language production [49]. This limited cognitive capacity would lead to a decrease in sentence complexity and lexical diversity as individuals rely on simpler sentence structure, and readily accessible words and phrases. Meanwhile, cognitive interference would cause a distraction of attention and confusion of thinking, thereby affecting individuals' accurate language production [45, 46]. By contrast, emotional anxiety characterized by physiological reactions had less influence on them.

6. Conclusion

6.1. Major Findings

The overall results of the test anxiety survey revealed that a considerable proportion of participants experienced high levels of test anxiety, with nearly half of the sample falling into the high-range category. This suggests that test anxiety is a prevalent issue among college students and warrants attention in academic settings. The division of test anxiety into worry and emotional dimensions further highlighted the cognitive and emotional aspects of anxiety experienced by students during tests. Notably, cognitive anxiety was found to be more pronounced than emotional anxiety, indicating the predominance of cognitive concerns and worries about test

performance among the participants.

Besides, test anxiety can have tangible effects on their task performance. Specifically, it was observed that high levels of test anxiety were associated with reduced syntactic complexity and decreased lexical diversity. This suggests that when students are highly anxious, they may struggle to generate complex and varied sentence structures and words, resulting in less sophisticated translation. Furthermore, test anxiety was also found to affect the accuracy of translation. Students experiencing high levels of anxiety were more prone to making errors in their translation. This could be attributed to heightened cognitive interference caused by anxiety, which can impair attention, memory, and problem-solving abilities. While the influence of test anxiety on fluency did not yield significant correlations in this study, further research with larger sample size and consideration of accurate measurement may provide additional insights into the relationship between anxiety and fluency in translation tasks.

In summary, these findings suggest that test anxiety can hinder language learners' ability to produce accurate and varied language output, highlighting the detrimental effects of anxiety on cognitive processes involved in translation tasks.

6.2. Implications

The findings of this study have important implications for translation task designers. Understanding the impact of test anxiety on bilingual translation tasks can inform the development of assessment materials that account for learners' psychological factors. This knowledge can guide the creation of translation tasks that are sensitive to the potential effects of test anxiety, ultimately leading to more accurate evaluations of language proficiency and a more supportive testing environment for language learners.

For translation instructors, this study underscores the need to recognize and address test anxiety among language learners. Educators can integrate specific strategies and support mechanisms into their teaching methodologies to help students manage test anxiety effectively. By creating an inclusive and supportive classroom environment, instructors can empower learners to optimize their performance in translation tasks and develop a more positive approach to language learning.

As for translation learners, this study highlights the importance of understanding and managing test anxiety in the context of language acquisition. By recognizing the potential impact of test anxiety on their performance, learners can seek out resources and strategies to mitigate its effects. This awareness can empower them to take proactive steps to manage test anxiety, ultimately enhancing their ability to engage with translation tasks and improving their overall language learning experience.

6.3. Limitations

The study has some limitations that should be considered when interpreting the results. First, the study's sample size and composition may limit the generalizability of the results. If the sample predominantly consists of students from a specific academic discipline or institution, the findings may not be representative of the broader student population. A more diverse sample across different disciplines and institutions would enhance the study's external validity.

Second, by focusing solely on the linguistic aspect of language performance, the study overlooks the crucial dimension of communication. Language is not only about

grammatical accuracy and vocabulary use but also about effective communication and interaction. Neglecting the communicative aspect may limit the study's ability to provide a holistic assessment of language proficiency and usage.

Third, the study's cross-sectional design may restrict the ability to examine the dynamic nature of test anxiety and writing performance over time. Longitudinal studies would offer valuable insights into how these variables evolve and interact across different stages of academic development.

Moving forward, future research should consider addressing these limitations by expanding the sample diversity, incorporating measures of communicative competence alongside linguistic proficiency, and adopting a longitudinal research design to yield deeper insights into the dynamic interplay between test anxiety and Chinese-to-English translation performance.

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APPENDIX

Table 1. Test Anxiety Inventory by Spielberger (1980)

Item	r	Subscale
1. I feel confident and relaxed while taking tests.	.56	
2. While taking examinations I have an uneasy, upset feeling.	.62	Emotionality
3. Thinking about my grade in a course interferes with my work on tests.	.52	Worry
4. I freeze up on important exams.	.64	Worry
5. During exams I find myself thinking about whether I'll ever get through school.	.45	Worry
6. The harder I work at taking a test, the more confused I get.	.49	Worry
7. Thoughts of doing poorly interfere with my concentration on tests.	.58	Worry
8. I feel very jittery when taking an important test.	.69	Emotionality
9. Even when I'm well prepared for a test, I feel very nervous about it.	.64	Emotionality
10. I start feeling very uneasy just before getting a test paper back.	.51	Emotionality
11.* During tests I feel very tense.	.72	Emotionality
12.* I wish examinations did not bother me so much.	.73	
13. During important tests I am so tense that my stomach gets upset.	.58	
14.* I seem to defeat myself while working on important tests.	.71	Worry
15.* I feel very panicky when I take an important test.	.78	Emotionality
16. I worry a great deal before taking an important examination.	.68	Emotionality
17. During tests I find myself thinking about the consequences of failing.	.50	Worry
18. I feel my heart beating very fast during important tests.	.54	Emotionality
19. After an exam is over I try to stop worrying about it, but I can't.	.53	
20.* During examinations I get so nervous that I forget facts I really know.	.71	Worry