



A correlational study on tolerance of ambiguity and English reading strategies use of non-English major undergraduate students

Yedan Xian^a, Sumalee Chinokul^a

^aMaster of Education in Bilingual Education, Suryadhep Teachers College, Rangsit University, Thailand

ABSTRACT

This study explored the relationship between the tolerance of ambiguity (TOA) of Chinese non-English major undergraduate students and their use of English reading strategies. TOA refers to an individual's ability to accept, manage, and remain comfortable with uncertain, unclear, or ambiguous situation in the context of language learning and comprehension, where meaning may not always be immediately apparent, particularly in English reading comprehension in this study. A mixed-methods research design was employed, including quantitative data and qualitative data. For collecting quantitative data, questionnaires were used for measuring TOA levels and reading strategies use from 371 undergraduate freshmen at a private university located in Guilin, China. While semi-structured interviews were used to collect qualitative data with 18 participants, 3 from each level of two questionnaires. The results showed that most participants performed a high TOA level, and a positive correlation was identified between TOA and reading strategies use. Specifically, students with higher TOA level tended to adopt flexible reading strategies. There are three dimensions of reading strategies, global strategies (e.g., setting reading goals), problem-solving strategies (e.g., making inferences), and support strategies (e.g., using dictionaries). And semi-structured interviews worked as an addition to confirming the finding. A limitation of this study is its focus on freshmen from a private university, which may restrict the generalizability of the findings to other educational contexts.

KEYWORDS

tolerance of ambiguity, reading strategies, non-English majors, quantitative research method, qualitative research method, EFL learning

CORRESPONDENCE

Yedan Xian (2663096845a@gmail.com)

INTRODUCTION

Language is the most important communication tool for human beings, and English, as a global bridge, connects different countries and cultures. With the acceleration of globalization, the learning of English is becoming increasingly popular, and reading is an important way to acquire new information. Mohammadi et al. (2020) pointed out that cognitive and psychological traits such as motivation, learning strategies, and tolerance of ambiguity (TOA) significantly affect the development of second language reading. Research

by Dewaele and Li (2020) defined TOA as an individual's ability to cope with uncertain or complex situations, and emphasized its influence on reading strategies and performance. The studies by Habók with Magyar (2019) and Jiang (2023) found that learners with higher TOA levels tend to adopt flexible metacognitive strategies, while learners with lower TOA levels rely more on literal understanding or avoidance strategies.

Although some studies have achieved certain results, most of them focused on English major students or high school students, and the attention paid to non-English major college students was still relatively limited. In particular, previous studies rarely examined how non-English major students, who usually lack extensive exposure to real reading contexts - develop and apply strategies under ambiguous conditions. Moreover, previous research often emphasized the individual effects of psychological traits or reading strategies, and rarely explored the interaction between TOA and strategic behaviors in real academic situations. Therefore, the relationship between TOA and reading strategies among Chinese non-English major undergraduate students has not been fully studied during their transition from structured high school learning to more autonomous university learning.

Reading is a crucial skill for EFL learners, enabling them to absorb knowledge and build language proficiency. However, many Chinese college students struggle to improve their reading performance despite years of formal English education, as reflected in their CET-4 and CET-6 results. The College English Test (CET), with levels 4 and 6, assesses undergraduates' and postgraduates' English proficiency based on the National College English Teaching Syllabuses (NCETS), yet complex or ambiguous texts remain challenging for many learners. These difficulties highlight the importance of individual differences in learning, particularly Tolerance of Ambiguity (TOA), which refers to one's ability to remain comfortable and function effectively amid uncertainty or incomplete information. Evidence from studies conducted by researchers such as Büşra (2020), Yang (2022), and Neda (2024) indicates that TOA can serve as a predictor of language learning outcomes. Their findings consistently show that learners with higher levels of TOA tend to demonstrate stronger cognitive engagement, more frequent use of learning strategies, and better reading comprehension. Learners with high TOA tend to adopt adaptive reading strategies, while those with low TOA often avoid ambiguity. Most existing research focuses on English majors or high school students, whereas this study explores the relationship between TOA and reading strategies among non-English major college students in China using a mixed-methods approach.

Although vocabulary size, grammatical knowledge, reading strategies, and background knowledge all influence reading comprehension, this study focuses on tolerance of ambiguity (TOA), as students inevitably encounter unfamiliar words, complex structures, or unclear meanings when reading English. TOA affects whether learners persist and flexibly apply strategies or give up due to confusion. Unlike vocabulary and grammar, which have long been emphasized in teaching, TOA has received insufficient attention. Improving TOA may support students in handling ambiguity effectively, thus enhancing reading performance. This is particularly important for Chinese college students preparing for CET-4 and CET-6, where reading comprehension accounts for 35% of the total score and reflects overall proficiency. Despite prior training in reading strategies during high school, many students still struggle in these exams.

This study was conducted in Guilin, Guangxi Province, China, targeting freshmen at a private university. Guangxi has relatively scarce educational resources compared to other provinces, but this university is considered outstanding among local institutions, making it representative for the study. Freshmen face a critical transition from structured high school

learning geared towards the College Entrance Examination (Gaokao) to a more autonomous university model where the College English Test (CET) becomes a major challenge, especially its reading section requiring quick and accurate text analysis. Many freshmen find their high school learning strategies insufficient for CET demands, making it crucial to explore how they adjust their reading strategies to adapt academically. This study focused on three variables: students' tolerance of ambiguity (TOA) levels, their use of English reading strategies (global, problem-solving, and support strategies), and interviewees' views on these variables. Therefore, this study investigated the correlation between non-English major students' TOA levels and their use of English reading strategies, aiming to enrich theoretical understanding, raise students' awareness of TOA, and guide teachers to adjust instructional approaches to improve reading outcomes under ambiguous conditions.

Research questions

1. What are the levels of the non-English undergraduate students' tolerance of ambiguity?
2. What are the levels of the non-English undergraduate students' English reading strategies use from the perspective of global strategies, problem-solving strategies and support strategies?
3. What is the relationship between non-English major students' tolerance of ambiguity and their use of English reading strategies?
4. What are students' opinions on how they use reading strategies, what challenges they may face, and how they deal with them?

LITERATURE REVIEW

Tolerance of Ambiguity (TOA)

Before the 1980s, tolerance of ambiguity (TOA) was mainly studied from a psychological perspective, but from the 1980s onward, it was explored in second language learning. Chapelle (1986) defined TOA as the ability to function rationally amid uncertainty and found it to predict language learning success, while Ely (1989) emphasized its role in learners' strategy use, and Durrheim and Foster (1997) argued it was content-specific rather than a general personality trait. Zhang (2004) investigated TOA in second language contexts, associating it with learning styles and attitudes toward ambiguous materials. Yin (2005) conceptualized it as the acceptance of linguistic ambiguities that may trigger anxiety, whereas Lai (2009) and Zhang (2011) characterized it as psychological adaptation to vagueness in unfamiliar language systems. Overall, TOA reflects learners' emotional and cognitive adjustments to complex information, evolving from psychology to SLA applications, and significantly affects reading efficiency and language acquisition in contexts like China's CET-4 and CET-6 exams, with foundational models such as Ely's SLATS (1989) remaining valuable for understanding English reading.

As interest in TOA grew, scholars developed reliable measurement tools. Budner (1962) created a 16-item Likert scale assessing tolerance-intolerance across novelty, complexity, and insolubility, while Ely (1989) designed a 12-item scale for second language learners with strong reliability (0.82) and construct validity. In China, Wen (2003) developed an 8-item

self-assessment scale referencing Brown. This study's TOA questionnaire adapts Ely's SLATS and Wen's self-test items, focusing on English reading by emphasizing emotional responses to ambiguity and applying Wen's scoring system to classify TOA levels, thus enabling analysis of its relationship with reading performance in the Chinese educational context.

Reading strategies

In foreign research, reading strategies have been broadly categorized by scholars such as Block (1986), who divided them into overall comprehension strategies (e.g., predicting content, marking text structure) and local language strategies (e.g., paraphrasing, rereading). Oxford (1992) further developed six types of reading strategies and created the Strategy Inventory for Language Learning (SILL). Mokhtari and Sheorey (2002) classified strategies into global, problem-solving, and support categories, developing the widely used Survey of Reading Strategies (SORS). In China, Liu (2002) identified strategies including prediction, vocabulary skills, and inference, while Zhang and Wu (2009) adapted SORS for Chinese learners, maintaining its original framework. Other researchers like Wang (2015) and Zheng (2015) highlighted metacognitive strategies focusing on monitoring and deep processing. This study adopts Zhang and Wu's SORS to classify Chinese university students' reading strategies into global, problem-solving, and support types. These models remain relevant in China's EFL context, where exams such as CET-4 and CET-6 demand effective strategy use to tackle complex texts.

Reading comprehension is central to the College English Tests (CETs), with performance influenced by learners' tolerance of ambiguity (TOA). Keshavarz and Assar (2011) and Li et al. (2022) found that TOA significantly affects how students handle ambiguous test content through their use of reading strategies. Lin et al. (2023) found that students with high TOA are better able to manage uncertainty, experiencing less anxiety and actively inferring meaning from context, whereas students with low TOA often encounter negative emotions that hinder their engagement and comprehension. Li et al. (2022) indicated that reading strategies mediate the relationship between TOA and reading outcomes, with high TOA learners employing diverse strategies such as prediction and intensive reading, whereas low TOA learners rely on limited methods like word-by-word decoding, which impairs comprehension. Lin et al. (2023) confirmed through structural equation modeling that TOA positively influences reading via strategy use. Yu et al. (2022) further demonstrated that higher TOA enhances engagement and resilience, helping students cope with exam ambiguity. Overall, TOA, reading strategies, and comprehension scores are closely interconnected.

The theory of Metacognition

Al-Mekhlafi (2018), Seidi (2018), Dardjito (2019), and Deliany and Cahyono (2020) emphasized the vital role of metacognition in reading comprehension, particularly in the use of reading strategies. Paris and Peter (2013) described metacognition as learners' awareness and monitoring of their cognitive processes during reading, including self-regulation of comprehension and emotional-motivational factors. Mokhtari and Reichard (2002) observed that skilled readers actively set goals, plan strategies, monitor understanding, and employ repair techniques to infer meaning, whereas unskilled readers often approach

reading as mere decoding. Building on this, Mokhtari and Reichard (2002) developed the Metacognitive Awareness of Reading Strategies Inventory (MARSI), which assesses readers' metacognitive awareness across three key dimensions (Table 1).

Table 1. The Dimensions of Metacognitive Awareness of Reading Strategies Inventory (MARSI)

Category	Description
Global Reading Strategies	It refers to generalized, intentional reading strategies aimed at setting the stage for the reading act, for example, setting purpose for reading, making predictions, etc.
Problem-solving Strategies	It refers to localized, focused problem-solving or repair strategies used when problems develop in understanding textual information, for example, checking one's understanding on encountering conflicting information or rereading for better understanding, etc.
Support Reading Strategies	It provides the support mechanisms aimed at sustaining responses to reading, for example, use of reference materials such as dictionaries and other support systems, etc.

In this study, these three strategy categories are treated as components of reading strategies regulated by metacognition, which interact with learners' tolerance of ambiguity (TOA). Mokhtari and Reichard's MARSI (2002) provides a complementary metacognitive perspective by explaining how learners' awareness and regulation guide strategy selection and adaptation. By combining these frameworks, the study treats metacognition as the regulating mechanism that links TOA to strategy use, while the SORS framework identifies the specific types of strategies employed. This explicit theoretical linkage ensures conceptual consistency: TOA shapes learners' tolerance for ambiguity, metacognition regulates strategy deployment, and reading strategies are the observable behaviors that mediate reading outcomes.

RESEARCH METHODOLOGY

Research Design

Previous methodological discussions presented by Aaro (2008), McKim (2017), and Ponterotto et al. (2013) suggest that integrating quantitative and qualitative approaches can strengthen triangulation and offer a more comprehensive understanding of the research topic. Following this rationale, the study employed a mixed-methods design. Quantitative data were collected using questionnaires to measure students' TOA levels and their use of English reading strategies. Qualitative data were gathered through semi-structured interviews to explore students' perceptions of TOA and strategy use. This approach ensured both breadth and depth in examining the research questions (Figure 1).

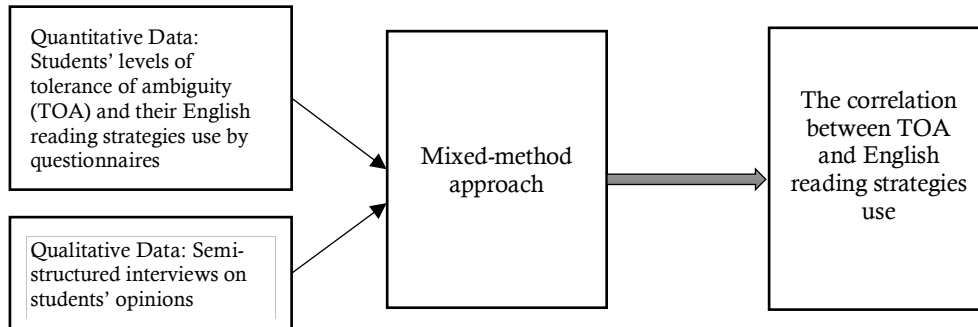


Figure 1. Research Design

Population and samples

The population comprised approximately 5,000 freshman undergraduate students, excluding English majors. This group was selected because non-English majors in China are required to take College English courses in the first two years and attempt CET-4 and CET-6 exams, typically during the first or second year of study. Based on Yamane (1967) formula with a 0.05 margin of error, the required sample size was calculated as 371 students (Figure 2). Simple random sampling was used to ensure fair representation, minimize selection bias, and maintain objectivity. For the qualitative phase, 18 students were purposefully selected (three from each level identified in the questionnaire) to participate in semi-structured interviews.

Sample Size Calculation

Formula:

$$n = \frac{N}{1 + N(e^2)}$$

Where:

- n = sample size
- N = population size (5,000)
- e = margin of error (5% or 0.05)

Steps:

1. $e^2 = (0.05)^2 = 0.0025$
2. $N \times e^2 = 5,000 \times 0.0025 = 12.5$
3. $n = \frac{5,000}{1+12.5} \approx 370.37$
4. Round up: **371**

Final Sample Size:

371 participants

Figure 2. Sample Calculation based on Taro Yamane's Formula

This study used simple random sampling because it ensured fair representation by giving everyone an equal chance of selection, minimized bias, and was easy, objective, and cost-effective. For qualitative data, 18 students (three from each level of the two questionnaires) who had completed the questionnaires and were willing to be interviewed were selected for semi-structured interviews.

Ethical issue

This study followed strict ethical standards to protect participants' rights and privacy. All participants were informed of the purpose of research, procedures, and their right to confidentiality, with personal information withheld and data anonymized. In addition, Institutional Review Board (IRB) approval was obtained to ensure compliance with ethical guidelines.

Participants were required to be Chinese freshmen or sophomores aged 18 or above, enrolled in College English Courses, with varying English proficiency levels. English majors, native English speakers, students without three years of Chinese high school education, and those who had taken part in similar studies were excluded to reduce potential bias. Participants retained the right to withdraw at any stage without penalty. Withdrawal was also permitted in cases of discomfort, health issues, personal emergencies, or non-compliance with study protocols. In all cases, withdrawn participants' data were anonymized and excluded from further analysis.

Research instruments

In accordance with the research methodology, diverse instruments were employed for the collection and analysis of both quantitative and qualitative data. Specifically, questionnaires facilitated the acquisition of quantitative data, whereas qualitative data was garnered through semi-structured interviews.

Questionnaire on Tolerance of Ambiguity among non-English major undergraduate students

The first research instrument is questionnaire of TOA. The design of the dimensions and items of the questionnaire about the TOA among senior undergraduate students are the key to this research. The tolerance of ambiguity scale in this study takes Ely's Second Language Tolerance of Ambiguity Scale (SLATS) and self-test questions of tolerance of ambiguity designed by Wen (2003) as reference. According to the needs of this study, the researcher made some revisions to fit the research subjects and research questions.

To elaborate specifically, this questionnaire includes 15 questions, which adopts the five-point Likert scale with 5 types of options: 1 refers to "Never or almost never true", 2 refers to "Sometimes untrue", 3 refers to "Not sure", 4 refers to "Sometimes true" and 5 refers to "Always or almost always true". Each option has its according score, and participants can check their total score after completing the questionnaire to determine which category of Tolerance of Ambiguity (TOA) they fall into. There are three categories corresponding to different score ranges:

- a) High Tolerance of Ambiguity: 60-75 points:
Students at this level are generally comfortable with ambiguity and uncertainty, willing to face complex or unclear situations, and show strong adaptability.
- b) Moderate Tolerance of Ambiguity: 45-59 points:
Students at this level show some adaptability in ambiguous situations, may feel uncomfortable but not strongly so, and can accept uncertainty in certain contexts.
- c) Low Tolerance of Ambiguity: 15-44 points:
Students at this level generally exhibit a low tolerance for ambiguity and uncertainty and may feel anxious and uncomfortable when facing complex situations.

Questionnaire on the use of English reading strategies by non-English major undergraduate students

The second instrument is another questionnaire: A Survey of Reading Strategy (SORS). In the survey of reading strategy, Zhang and Wu (2009) adapted the SORS from Mokhtari and Sheorey (2002) and designed a new questionnaire specifically measuring reading strategies for learners of strategic English as a second language, while maintaining the original classification of strategies from Mokhtari and Sheorey. Based on this, the researcher designed an individualized questionnaire.

Specifically, this questionnaire includes 15 questions, and it adopts the five-point Likert scale with 5 types of options: 1 refers to “Never or almost never applies”, 2 refers to “Sometimes does not apply”, 3 refers to “Uncertain”, 4 refers to “Sometimes applies” and 5 refers to “Always or almost always applies”. Each option has its according score, and participants can check their total score after completing the questionnaire to determine which category of English reading strategies usage levels they fall into. There are three categories corresponding to different score ranges:

- a) High Level: 56-75 points:
Participants make good use of reading strategies, applying a variety of strategies flexibly to improve their understanding and memory. This suggests they have strong reading abilities and are capable of effectively dealing with academic materials.
- b) Moderate Level: 36-55 points:
Participants demonstrate some ability to use reading strategies, applying them in certain situations, but there is room for improvement. This suggests that while they may be able to effectively understand materials in some contexts, they may face challenges when dealing with more complex texts.
- c) Low Level: 15-35 points:
Participants use reading strategies infrequently, and they may encounter difficulties when understanding and processing academic materials. This suggests they may need more guidance and support to improve their reading abilities and strategy use.

Semi-structured interview

DiCicco-Bloom and Crabtree (2006) noted that semi-structured interviews are the most common qualitative interview method. Galletta and Cross (2013) and Kallio et al. (2016)

highlighted that this method fosters reciprocity, allows flexible follow-up questions, and enables participants to express themselves freely. After reviewing questionnaire data, the researcher selected three from each level, resulting in nine participants per questionnaire and a total of 18 participants for the two questionnaires, to explore whether there is a relationship between TOA and reading strategies. An interview outline was prepared in advance, and interviews were conducted online without requiring cameras. With participants' consent, interviews were recorded and later transcribed to protect their privacy and ensure data accuracy.

Validity and reliability of the research instruments

The two questionnaires in this study adopted existing mature scales without recalculating reliability and validity, using Ely's (1989) SLATS with a Cronbach's alpha of 0.82 and the SORS adapted from Mokhtari and Sheorey (2002) with a Cronbach's alpha of 0.89, both showing high internal consistency. For content validity, three Thai experts evaluated all questionnaire and interview items using the IOC method (-1, 0, +1 scoring) to assess consistency with objectives, where items scoring between 0.67–1.00 were accepted. For example, item 1 scored $(1+1+0)/3=0.67$ and was adjusted accordingly.

Most items scored 1, except items 2, 5, and 14 of questionnaire 1 scoring 0.67 and were revised. Experts also reviewed content coverage, interconnections, applicability, and language accuracy. Intercoder reliability was calculated by comparing independent coding results for interviews to ensure data analysis consistency. Additionally, questionnaires underwent back-translation: one expert translated them into Chinese, another back into English without accessing the originals, and discrepancies were discussed and revised to maintain linguistic and conceptual equivalence, ensuring the instruments' credibility and validity.

Data collection

Since the mixed-methods approach has applied by previous similar studies, integrating quantitative and qualitative analyses, the researcher uses it for its authority in a new context. Data collection was conducted at a private university in Guilin, China, where the researcher first contacted the institution to arrange collaboration. For quantitative data, 371 participants completed Chinese versions of the questionnaires online within 5–10 minutes, with the surveys kept open for several days for convenience. For qualitative data, semi-structured interviews were conducted online with 18 students who had completed the questionnaires and agreed to be interviewed. Each session lasted 10–20 minutes, was conducted once per participant, and was audio-recorded for subsequent analysis.

Data analysis

Quantitative data

The quantitative data analysis in this study involved three main steps. First, the TOA and reading strategy scores of 371 participants were calculated and categorized into low, moderate, and high levels based on predefined score ranges. Second, the distribution of

reading strategy use within each TOA level was analyzed by calculating the number and percentage of participants in each category, thus mapping reading strategy use against TOA levels. Finally, conclusions were drawn based on these analyses, as detailed in Results.

Qualitative data

The qualitative data from interviews with 18 non-English major undergraduates were analyzed following the six-phase thematic analysis approach proposed by Braun and Clarke (2019), which involves familiarization, coding, theme development, review, definition, and write-up. Interviews were conducted in Chinese, transcribed using an online tool with pseudonyms assigned for confidentiality, and translated into English for analysis. During familiarization, transcripts were read multiple times with preliminary notes taken to identify initial patterns, laying the groundwork for systematic coding and subsequent thematic analysis, with selected responses summarized in Table 2 to illustrate participants' key concerns about reading strategies and difficulties.

Table 2. A Selection of Responses from a Few Interviewees

Interview Questions	Answers of Actual Interviewees
1. What do you think enables you to remain calm in the face of uncertain or ambiguous information in your study?	When encountering uncertain or ambiguous information, I can search for similar situations or related concepts within my existing knowledge system and extract clues from them, so I don't feel panicked. (Interviewee 3, personal communication, May 8, 2025)
2. When reading complex English materials, what strategies do you use most often to help yourself understand? How effective are these strategies?	When reading difficult English texts, I highlight key words, focus on core sentence structures, and paraphrase the content in my own words, sometimes using Chinese analogies. Though slow at first, consistent practice improves both speed and accuracy. (Interviewee 1, personal communication, May 8, 2025)
3. How do your strategies change when you feel that your reading content is obscure or complicated?	When facing complex content, I seek support by consulting simpler materials, using translation tools for rough understanding, and discussing with peers. Highlighting unclear parts and revisiting them later also helps deepen comprehension. (Interviewee 2, personal communication, May 8, 2025)
4. If a piece of text is very difficult to understand, do you prefer to adjust your strategies or avoid dealing with such content?	When facing key content, I adjust strategies like using videos, translation tools, or copying text to aid understanding. I mark unfamiliar words and revisit them later when less pressed for time. (Interviewee 6, personal communication, May 8, 2025)

In the second phase, open coding was manually conducted on all transcripts to identify meaningful data units, focusing on participants' emotional reactions to ambiguity, strategic responses to difficult English texts, and adaptive behaviors. Guided by the interview protocol, initial codes were inductively derived rather than based on a preset scheme, generating 30 distinct codes such as "Accepting Ambiguity" and "Curiosity-driven", capturing both cognitive and affective aspects of strategy use and TOA. Each code was iteratively reviewed for clarity, consistency, and conceptual relevance, forming a preliminary coding framework for subsequent thematic analysis. Table 3 presents representative excerpts and their corresponding codes as concrete categorization examples.

Table 3. A Selection of Open Codes Applied to the Interviewees' Responses

Interviewees	Transcript Excerpts	Initial Code(s)
1	Break down the vague problem into manageable small pieces	Problem Decomposition
2	Pretend to be a robot, just analyze without panicking	Emotional Regulation
3	Consult materials (books, dictionaries) to aid understanding	External Support

In the third phase, the researcher organized initial codes into three key themes reflecting how participants dealt with ambiguity during English reading: Global Reading Strategies, Problem-solving Strategies, and Support Reading Strategies. Under Global Reading Strategies, codes like accepting ambiguity, encouraging oneself to face uncertainty, and maintaining a calm mindset were grouped, highlighting cognitive and emotional regulation. Problem-solving Strategies included approaches such as skimming for main ideas, inferring meaning from context, and systematic reading to tackle difficulties. Support Reading Strategies covered the use of external aids, such as identifying key words, recalling teacher examples, and using recurring concepts to enhance understanding. Each theme was refined for clarity and distinctiveness, with interactions explored—for instance, emotional regulation influencing strategy choice, and external resources building confidence. Table 4 illustrates how open codes were synthesized into these overarching themes.

Table 4. Examples of Open Codes Merged into Themes

Reading Strategies	Open Codes	Transcript Segments	The Researcher's Codes
Global Reading Strategies	1. Accepting Ambiguity	Remind myself that ambiguity is a normal stage in the learning process	1
Problem-solving Strategies	17. Skimming	When encountering a screen full of new words, quickly skim through without looking them up	17
Support Reading Strategies	27. Keyword	Quickly mark the main idea and key words	27

To ensure coding reliability, a second independent coder fluent in Chinese and English with relevant expertise was invited for intercoder reliability (ICR) checks. The researcher

first underlined text segments relevant to research questions in all transcripts and assigned descriptive codes with numerical identifiers to each segment, generating 30 codes categorized into three themes: global strategies, problem-solving strategies, and support strategies, which were compiled into a coding book. The second coder independently recoded the underlined segments using this book without access to the initial coding results. Their coding was then compared with the researcher's for consistency. The researcher organized numerical codes into a comparison table for SPSS analysis, and Cohen's Kappa coefficients were calculated separately for each theme to assess agreement accuracy within each category. The high Kappa value indicates a substantial level of agreement between coders, confirming the consistency of the thematic classification. And the results of the total of three themes are presented in Table 4, demonstrating a high level of agreement across all themes and thus enhancing the credibility of the qualitative findings.

Table 5. Cohen's Kappa Coefficients for Inter-coder Reliability Across Themes

Theme Name	Cohen's Kappa Value
Global Reading Strategies	0.879
Problem-solving Strategies	0.844
Support Reading Strategies	0.779

Integration of quantitative and qualitative data

The integration of quantitative and qualitative data in this study provided a comprehensive understanding of the research questions, particularly Research Question 4 on students' opinions, challenges, and coping strategies in using reading strategies. Quantitative results showed a strong positive correlation between students' tolerance of ambiguity (TOA) and their reading strategy use, indicating that students with higher TOA levels tended to employ a wider range of effective strategies. However, while these findings revealed what the relationship was, they did not explain why it existed. Therefore, qualitative interview data were integrated to supplement and interpret the statistical results. Thematic analysis revealed that high TOA students often viewed ambiguity as a learning opportunity and adopted flexible strategies such as prediction and inference, whereas low TOA students relied more on word-by-word translation, felt anxious, and avoided difficult texts. This explanatory sequential design allowed the study to establish not only that a significant relationship existed but also how students' attitudes towards ambiguity influenced their strategic reading behaviors. Overall, combining both data sets enhanced the depth, validity, and practical implications of the research, providing a holistic understanding of the factors affecting EFL learners' reading strategy use.

RESULTS

The analysis of research question 1

To answer the first research question: "What are the levels of the non-English undergraduate students' tolerance of ambiguity?", Table 6 showed that most students exhibited a high level of TOA, with 63.35% scoring between 56 and 75 points, indicating that most students were

comfortable with uncertainty and could cope with ambiguous situations in their studies. In contrast, 15.63% of students fell into the low-level category (15–35 points), suggesting they struggled more with ambiguity and tended to avoid unclear content, while the remaining 21.02% were at a moderate level (36–55 points), showing mixed responses depending on the context. Overall, these findings suggested a general trend towards high TOA among non-English major undergraduates, which might benefit them in dealing with complex academic content and provided a foundation for further examining how TOA influences their use of reading strategies.

Table 6. The Current Situation of Non-English Undergraduate Students' Tolerance of Ambiguity

TOA Levels	Frequency	Percentage
Low Level (15-35 points)	58	15.63%
Moderate Level (36-55 points)	78	21.02%
High Level (56-75 points)	235	63.35%

The analysis of research question 2

To assess students' overall use of English reading strategies and address Research Question 2, "What are the levels of non-English undergraduate students' use of English reading strategies in terms of global, problem-solving, and support strategies?", Table 6 showed that the majority of students (59.07%) exhibited a high level of reading strategy use (56–75 points), indicating consistent use of a wide range of strategies such as setting reading goals, re-reading, and seeking clarification to enhance comprehension. In contrast, 17.51% fell into the low-level category (15–35 points), suggesting limited or ineffective use of strategies and a need for further training to improve comprehension, while the remaining 23.42% were at a moderate level (36–55 points), indicating occasional or inconsistent strategy use depending on task difficulty. Overall, these findings revealed that most non-English major undergraduates actively employed reading strategies, which is crucial for their academic success, highlighting the need to further promote and enhance their strategic reading skills to improve English proficiency.

Table 7. Students' Overall Use of Reading Strategies

Reading Strategies Use	Frequency	Percentage
Low Level (15-35 points)	65	17.51%
Moderate Level (36-55 points)	87	23.42%
High Level (56-75 points)	219	59.07%

The analysis of research question 3

To delve deeper into Research Question 3, "What is the correlation of non-English undergraduate students' tolerance of ambiguity (TOA) and their English reading strategies use?", a Pearson correlation analysis revealed a strong positive correlation ($r = 0.879$, $p < 0.01$), suggesting that learners with higher TOA levels were more likely to employ a wider

range of reading strategies effectively, thus providing empirical support for the hypothesis that TOA plays an important role in shaping strategic reading behavior among EFL learners.

Correlations

		TOA	Reading Strategies Use
TOA	Pearson Correlation	1	.879**
	Sig. (2-tailed)		<.001
	N	18	18
Reading Strategies Use	Pearson Correlation	.879**	1
	Sig. (2-tailed)	<.001	
	N	18	18

** . Correlation is significant at the 0.01 level (2-tailed).

Figure 4. Pearson Correlation between Tolerance of Ambiguity and Reading Strategies Use

The next step analyzed the distribution of students' reading strategy use across different levels of tolerance of ambiguity (TOA) by calculating the number and percentage of participants in each reading strategy use level (low, moderate, high) within each TOA group, revealing whether students with higher TOA levels tended to use reading strategies more frequently and effectively.

Table 8. Distribution of Reading Strategy Use Across Different TOA Levels

TOA Level	Reading Strategy Use	Frequency	Percentage within TOA Group
Low TOA (n = 58)	Low Strategy Use	35	60.34%
	Moderate Strategy Use	15	25.86%
	High Strategy Use	8	13.79%
Moderate TOA (n = 78)	Low Strategy Use	20	25.64%
	Moderate Strategy Use	28	35.90%
	High Strategy Use	30	38.46%
High TOA (n = 235)	Low Strategy Use	15	6.38%
	Moderate Strategy Use	60	25.53%
	High Strategy Use	160	68.09%

For students with low TOA (58 participants), most (60.34%) tended to use only basic reading strategies, suggesting they approached reading tasks with less strategic engagement due to discomfort with textual uncertainty, while 25.86% reported moderate strategy use and only 13.79% used high-level strategies, indicating low TOA limited their use of effective strategies and led them to focus on surface-level comprehension. In contrast, the moderate TOA group (78 participants) showed a more balanced distribution, with 25.64% using low-level strategies, 35.90% using moderate-level strategies, and 38.46% using high-level strategies, suggesting greater flexibility and openness to adopting various strategies such as inference and summarization despite occasional challenges. The high TOA group (235 participants) exhibited the most pronounced use of high-level strategies, with 68.09% reporting high-level strategy use, indicating comfort with ambiguity allowed deeper strategic engagement through critical analysis, prior knowledge connections, and prediction, while only 6.38% used low-level strategies and 25.53% used moderate-level strategies. Overall, this analysis

showed that as students' TOA increased, their reading strategy use became more advanced, supporting the idea that higher TOA enabled learners to employ a broader range of effective reading strategies to cope with complex texts.

The analysis of research question 4

To better understand the reasons behind this strong correlation and to answer research question 4 “What are students’ opinions on how they use reading strategies, what challenges they may face, and how they deal with them?”, interviews were conducted with 18 randomly selected students to explore their opinions, challenges, and coping strategies. Results showed that high TOA students viewed ambiguity as a learning opportunity, maintained positive attitudes, and flexibly used strategies such as prediction, inference, and integrating prior knowledge; moderate TOA students attributed their calmness to accumulated experience and confidence, mainly relied on support strategies like rereading or dictionary use, and adjusted strategies only when initial attempts failed; low TOA students often depended on external support but still felt anxious, mainly used word-by-word translation and repeated reading, which were ineffective, and some even chose to abandon difficult texts altogether due to frustration. Overall, high TOA students were proactive, strategic, and resilient in dealing with ambiguity, moderate TOA students showed partial adaptability but lacked flexibility, while low TOA students struggled with both emotional regulation and strategic application, often avoiding challenges rather than adjusting approaches, explaining why students with higher TOA employed a wider range of effective reading strategies to engage deeply with complex texts.

In summary, the study found a strong positive relationship between tolerance of ambiguity (TOA) and the use of effective English reading strategies among non-English major undergraduates. Students with high TOA employed more advanced and flexible strategies, while those with low TOA relied on basic methods and often avoided difficult texts. Qualitative data showed that high TOA students viewed ambiguity as a learning opportunity, whereas low TOA students struggled emotionally and strategically. These results highlight the importance of teaching interventions focused on building TOA and metacognitive skills to improve reading proficiency. Future research should explore TOA development and its role in strategy use.

DISCUSSION

Mohammadi et al. (2020) stated that cognitive and psychological traits such as motivation, learning strategies, and tolerance of ambiguity (TOA) significantly affect second language reading development. In the present study, analysis of non-English major undergraduates' TOA revealed varied cognitive and behavioral responses to ambiguity in English reading. Quantitative results showed that most students (63.35%) demonstrated high TOA, 21.02% moderate TOA, and 15.63% low TOA.

High TOA students tended to perceive ambiguous or uncertain reading materials as opportunities for learning, enabling them to plan, monitor, and adjust their reading strategies effectively. This finding aligns with qualitative evidence: Interviewee 3 noted, “When encountering uncertain information, I search for related concepts within my knowledge system to find clues, so I don’t feel panicked.” Such metacognitive flexibility supports the observations of Sadeghi and Bakhshi (2025) and de Vries (2021) that learners with high TOA

frequently employ global strategies, such as previewing text structures and inferring meaning from context, to manage ambiguity.

Conversely, low TOA students experienced anxiety and frustration when facing uncertain texts, often relying on support strategies to cope. This pattern was evident both in the data—60.34% of low TOA students used strategies less extensively—and in interviews. For example, Interviewee 6 stated, “I mark unfamiliar words and revisit them later when less pressed for time,” reflecting avoidance of immediate engagement with complex content. These findings are consistent with Durmaz and Aşık (2022) and Jiang (2023), who noted that low TOA learners depend on external tools and may show reduced metacognitive flexibility.

Moderate TOA students displayed context-dependent adaptability, adjusting strategies according to task complexity, which echoes Wang’s (2021) view of TOA as a dynamic trait. Overall, the correlation between TOA and reading strategy use was strong ($r = 0.879$, $p < 0.01$), confirming Mirsadegh et al.’s (2021) opinions that TOA influences how learners interpret and manage ambiguous information. High TOA students combined global and problem-solving strategies flexibly, whereas low TOA learners over-relied on support strategies, limiting comprehension.

These results underscore the importance of distinguishing learners’ perceptions of ambiguity in both research and teaching. High TOA students’ tendency to see ambiguity as an opportunity highlights the potential for fostering strategic adaptability through targeted instruction. In contrast, low TOA students’ anxiety-driven responses indicate a need for interventions that build confidence and metacognitive skills. Baharloo and Ghasemian (2024), along with Li et al. (2022), further suggest that explicit strategy training is necessary to complement TOA development, particularly for non-English majors who have limited exposure to authentic reading contexts.

CONCLUSION

This study examined the relationship between non-English major undergraduates’ tolerance of ambiguity (TOA) and their use of English reading strategies. Most students showed high TOA, comfortably handling ambiguous academic texts, and frequently used a variety of advanced reading strategies, including global, problem-solving, and support types. A strong positive correlation indicated that higher TOA was linked to more effective strategy use, while lower TOA students relied on basic, less effective methods. Qualitative data revealed that high TOA students were proactive, flexible, and metacognitively aware, viewing ambiguity as a learning opportunity. Moderate TOA students used fewer and less flexible strategies, often relying on rereading and dictionaries, whereas low TOA students experienced anxiety, preferred word-by-word translation, and avoided challenging texts. Overall, TOA significantly influences strategy use and reading comprehension, underscoring the need to develop both TOA and strategic skills to improve EFL learners’ reading performance.

Limitation of the study

Despite its contributions, this study has some limitations. Firstly, it only focused on freshmen non-English major students from a single private university in Guilin, which limits the generalizability of the findings to other regions or educational contexts in China.

Secondly, the data collection relied on self-reported questionnaires and interviews, which may be influenced by participants' subjective perceptions, social desirability bias, or misunderstandings of items. Thirdly, although the mixed-methods design provided comprehensive insights, the qualitative data were limited to a small number of interviewees, potentially overlooking diverse experiences among the broader population. Lastly, this study only explored the correlation between TOA and reading strategies without examining other influential variables, such as motivation, anxiety, or metacognitive awareness, which might interact with TOA and strategy use. Future research could address these limitations by including larger and more diverse samples, using longitudinal designs, and incorporating additional cognitive and affective factors to deepen the understanding of EFL reading processes.

Recommendations

For students, developing awareness of their tolerance of ambiguity (TOA) is essential, as it influences how effectively they engage with English reading. Those with lower TOA should be taught to view unfamiliar vocabulary, complex structures, and cultural references as opportunities rather than threats, gradually building emotional and cognitive flexibility through exposure to varied texts. Reflective practices like self-monitoring strategy use and maintaining reading journals can enhance metacognitive awareness, while collaborative activities may reduce anxiety and broaden strategic options. Ultimately, TOA is a skill that can be strengthened over time, improving confidence, flexibility, and overall reading competence.

EFL teachers should adopt different instructions responsive to students' varying TOA levels. Gradually introducing controlled ambiguity in reading tasks, starting with scaffolded materials, and progressing to more inferential texts, can help build learners' comfort with uncertainty. Explicit teaching of global, problem-solving, and support strategies through modeling and guided practice is crucial, especially for low TOA students who may need more support and feedback. Normalizing uncertainty in classroom discussions and using formative assessments that value strategic engagement can foster a positive learning environment. Through such pedagogical approaches, teachers can cultivate more resilient and strategic readers, enhancing both comprehension and learner autonomy.

Future research should broaden the scope by including diverse participant groups across different institutions, academic levels, and cultural contexts to evaluate the generalizability of findings on TOA and reading strategies. Longitudinal and experimental studies could explore how TOA and strategies use develop over time and respond to targeted interventions. Investigating other psychological factors like motivation or anxiety may clarify their interaction with TOA. Comparative studies across disciplines and EFL contexts, as well as research on discipline-specific academic reading in EMI settings, would further enrich understanding. Continued inquiry into the dynamic relationship between psychological tolerance and reading behavior will inform more effective and inclusive EFL instruction.

DISCLOSURE STATEMENT

The authors declare that there is no conflict of interest in this study.

During writing, AI tools like ChatGPT and Grammarly were employed only for grammar checking and language refinement. The authors affirm that AI tools were not for generating ideas, conducting analysis, or drawing conclusions. All data analysis are entirely the authors' own work.

REFERENCES

- Aaro, T. (2008). Variables in psychology: A critique of quantitative psychology. *Integrative Psychological and Behavioral Science*, 42(2), 159–178. <https://doi.org/10.1007/s12124-008-9058-9>
- Al-Mekhlafi, A. M. (2018). EFL learners' metacognitive awareness of reading strategies. *International Journal of Instruction*, 11(2), 297–308. <https://doi.org/10.12973/iji.2018.11220a>
- Galletta, A., & Cross, W. E. (2013). *Mastering the semi-structured interview and beyond: From research design to analysis and publication* (Vol. 18). NYU press.
- DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical education*, 40(4), 314-321.
- Baharloo, A., & Ghasemian, Z. (2024). The interplay of Iranian EFL learners' tolerance of ambiguity and their reading performance encountering unknown vocabularies: Taking their L2 reading anxiety into account. *International Journal of Research in English Education*, 9(3), 61-74.
- Block, E. (1986). The comprehension strategies of second language readers. *TESOL Quarterly*, 20(3), 463–494. <https://doi.org/10.2307/3586295>
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Liamputtong (Ed.), *Handbook of research methods in health social sciences* (pp. 843–860). Springer Singapore. https://doi.org/10.1007/978-981-10-5251-4_103
- Budner, S. (1962). Intolerance of ambiguity as a personality variable. *Journal of Personality*, 30(1), 29–50. <https://doi.org/10.1111/J.1467-6494.1962.TB02303.X>
- Büşra, Y. (2020). Tolerance of ambiguity and cognitive engagement in language learning outcomes. *Applied Linguistics Journal*, 41(5), 620-635.
- Chapelle, C., & Roberts, C. (1986). Ambiguity tolerance and field independence as predictors of proficiency in English as a second language. *Language Learning*, 36(1), 27–45. <https://doi.org/10.1111/J.1467-1770.1986.TB00367.X>
- Daqing, W. (2021). An analysis of tolerance of ambiguity in second language learning. *Sino-US English Teaching*, 18(9), 250-260. <https://doi.org/10.17265/1539-8072/2021.09.003>
- Dardjito, H. (2019). Students' metacognitive reading awareness and academic English reading comprehension in EFL context. *International Journal of Instruction*, 12(4), 611–624. <https://doi.org/10.29333/iji.2019.12439a>
- Deliany, Z., & Cahyono, B. Y. (2020). Metacognitive reading strategies awareness and metacognitive reading strategies use of EFL university students across gender. *Studies in English Language and Education*, 7(2), 421–437. <https://doi.org/10.24815/siele.v7i2.17026>
- Dewaele, J.-M., & Li, C. (2020). Emotions in second language acquisition: A critical review and research agenda. *Foreign Language World*, 196(1), 34-49.
- de Vries, H. H. (2021). Tolerance of ambiguity. In *The Palgrave encyclopedia of the possible* (pp. 1-16). Palgrave Macmillan, Cham.
- Durmaz, B. N. (2020). *The relationship between listening metacognitive awareness, foreign language listening anxiety and ambiguity tolerance of Turkish EFL students* [Unpublished Master's thesis, Gazi University]. Gazi University.

- Durmaz, B. N., & Aşık, A. (2022). Relationship between metacognitive awareness, listening anxiety and ambiguity tolerance of Turkish EFL learners. *The Reading Matrix*, 22(2), 173–187. <https://www.researchgate.net/publication/363335646>
- Durrheim, K., & Foster, D. (1997). Tolerance of ambiguity as a content specific construct. *Personality and Individual Differences*, 22(5), 741–750. [https://doi.org/10.1016/S0191-8869\(96\)00207-3](https://doi.org/10.1016/S0191-8869(96)00207-3)
- Ely, C. M. (1989). Tolerance of ambiguity and use of second language strategies. *Foreign Language Annals*, 22(5), 437–445. <https://doi.org/10.1111/J.1944-9720.1989.TB02766.X>
- Habók, A., & Magyar, A. (2019). The role of metacognitive strategies and tolerance of ambiguity in second language reading comprehension. *System*, 80, 123–135.
- Jiang, Y. (2023). Tolerance of ambiguity, reading strategies and foreign language anxiety in English learning. *Curriculum and Teaching Methodology*, 6(16), 1–6. <https://doi.org/10.23977/curtm.2023.061601>
- Jing, Z. (2015). A study on foreign language reading strategies from the perspective of schema activation theory. *Computer-Assisted Foreign Language Education in China*, (1), 67–72.
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, 72(12), 2954–2965. <https://doi.org/10.1111/jan.13031>
- Keshavarz, M. H., & Assar, M. (2011). Reading comprehension ability and metacognitive awareness of reading strategies among high, mid and low ambiguity tolerance EAP students. *Iranian Journal of Applied Language Studies*, 1(2), 71–108.
- Kianinezhad, N. (2024). Investigating the influence of ambiguity tolerance and resilience on student engagement: A literature review. *English Learning Innovation (Englie)*, 5(1), 58–69. <https://doi.org/10.22219/englie.v5i1.28210>
- Mokhtari, K., & Sheorey, R. (2002). Measuring ESL students' awareness of reading strategies. *Journal of developmental education*, 25(3), 2–11.
- Lai, P. (2009). Psychological representation and cognitive analysis of ambiguity tolerant language learning style. *Journal of Tianjin Foreign Studies University*, 16(6), 67–72.
- Li, H., Gan, Z., Leung, S. O., & An, Z. (2022). The impact of reading strategy instruction on reading comprehension, strategy use, motivation, and self-efficacy in Chinese university EFL students. *SAGE Open*, 12(1). <https://doi.org/10.1177/21582440221086659>
- Lin, Y., Niu, R., & Yu, Z. (2023). Roles of ambiguity tolerance and learning effectiveness: Structural equation modeling evidence from EFL students' perceptions of factors influencing peer collaboration. *Language Teaching Research*. Advance online publication. <https://doi.org/10.1177/13621688231216201>
- Liu, D. (2002). A study on reading strategies of Chinese English learners. *Foreign Language World*, 6, 13–18.
- McKim, C. A. (2017). The value of mixed methods research: A mixed methods study. *Journal of Mixed Methods Research*, 11(2), 202–222. doi:10.1177/1558689815607096
- Mirsadegh, M., Hooman, F., & Homaei, R. (2021). Relationship between tolerance of ambiguity and family cohesion with academic engagement based on mediating role of academic resilience in female students. *Social Determinants of Health*, 7(1), 1–11. <https://doi.org/10.22037/sdh.v7i1.34811>
- Mohammadi, R. R., Saeidi, M., & Ahangari, S. (2020). Self-regulated learning instruction and the relationships among self-regulation, reading comprehension and reading problem solving: PLS-SEM approach. *Cogent Education*, 7(1), 1784534. <https://doi.org/10.1080/2331186X.2020.1746105>
- Mokhtari, K., & Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology*, 94(2), 249–259. <https://doi.org/10.1037/0022-0663.94.2.249>
- Neda, H. (2024). The predictive role of tolerance of ambiguity on strategy use and reading comprehension. *Modern Language Journal*, 108(1), 100–115.
- Oxford, R. L. (1992). Research on second language learning strategies. *Annual Review of Applied Linguistics*, 13, 174–187. <https://doi.org/10.1017/S0267190500002452>

- Paris, S. G., & Winograd, P. (2013). How metacognition can promote academic learning and instruction. In *Dimensions of thinking and cognitive instruction* (pp. 15-51). Routledge.
- Ponterotto, J. G., Mathew, J. T., & Raughley, B. (2013). The value of mixed methods designs to social justice research in counseling and psychology. *Journal for Social Action in Counseling and Psychology*, 5(2), 16-29.
- Sadeghi, K., & Bakhshi, N. (2025). Integrated listening/speaking skill assessment: The role of ambiguity tolerance, cognitive/metacognitive strategy use, and foreign language anxiety. *International Journal of Language Testing*, 15(1), 77-90.
<https://doi.org/10.22034/ijlt.2024.452581.1338>
- Seidi, N. (2018). The effect of ambiguity tolerance and gender on Iranian EFL learners reading comprehension. *Journal of Applied Linguistics and Language Research*, 5(4), 130-139.
<https://www.researchgate.net/publication/341541916>
- Wang, X. (2015). Effect of meta-cognitive strategy training on Chinese EFL learners' reading competence. *International Journal of English Linguistics*, 5(1), 159-165.
<https://doi.org/10.5539/IJEL.V5N1P159>
- Wen, Q. (2003). *The road to success in learning English*. Shanghai Foreign Language Education Press.
- Yamane, T. (1967). *Elementary sampling theory*. Prentice-Hall.
- Yang, N. (2022). An investigation into the interplay between Chinese EFL teachers' emotional intelligence, ambiguity tolerance, and work engagement. *Frontiers in Psychology*, 13.
<https://doi.org/10.3389/fpsyg.2022.929933>
- Yin, Y. (2005). The impact of "ambiguity tolerance" on English learning and its implications for classroom English teaching. *Foreign Language World*, 2, 58-61.
- Yu, M., Wang, H., & Xia, G. (2022). The review on the role of ambiguity of tolerance and resilience on students' engagement. *Frontiers in Psychology*, 12.
<https://doi.org/10.3389/fpsyg.2021.828894>
- Zhang, L. J., & Wu, A. (2009). Chinese senior high school EFL students' metacognitive awareness and reading-strategy use. *Reading in a Foreign Language*, 21(1), 37-59.
<https://scholarspace.manoa.hawaii.edu/handle/10125/66635>
- Zhang, Q. (2004). The influence of ambiguity tolerance on the choice of foreign language learning strategies. *Foreign Language Teaching and Research*, 6, 457-461.
- Zhang, S. (2011). A study on the influence of foreign language ambiguity tolerance based on different learning tasks. *Journal Beijing International Studies University*, 33(8), 70-75.

FUNDING

This research received no external funding.

BIODATA

Yedan Xian is an M.Ed. student in bilingual education at Suryadhep Teachers College, Rangsit University, Thailand.

Sumalee Chinokul is an Associate Professor at Suryadhep Teachers College, Rangsit University, and also serves as Vice-chairman of the IRB2 of Chulalongkorn University. Her research focuses on English language teacher education, English for Specific Purposes, Classroom-based assessment and research in English language Instruction.

How to cite this article:

Xian, Y., & Chinokul, S. (2025). A correlational study on tolerance of ambiguity and English reading strategies use of non-English major undergraduate students. *Journal of Language and Culture*, 44(2), 88–108.

Received: 12 July 2025

Revised: 6 September 2025

Accepted: 22 September 2025

© The Author(s) 2025. *Journal of Language and Culture* published by Research Institute for Languages and Cultures of Asia, Mahidol University. This article is open access under a Creative Commons Attribution 4.0 International License, permitting the use, sharing, adaptation, distribution, and reproduction in any medium or format. Users are required to provide appropriate credit to the original author(s) and the source, include a link to the Creative Commons license, and indicate if any changes were made. The images or other third-party materials included in this article fall under the article's Creative Commons license unless otherwise specified in a credit line. If the material is not covered by the article's Creative Commons license or if your intended use goes beyond what is permitted by statutory regulation, you must seek permission directly from the copyright holder.