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Influencing Mechanisms of Time-Space-Interest Factor on Readers' Language and Literature Reading Behaviors: Mediation by Interest Category Scope and Moderation by Their Interaction

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Abstract

This study explores the influencing mechanisms of time-space-interest (TSI) factors on readers' reading behaviors in the field of language and literature, with a specific focus on the mediating role of interest category scope and the moderating effect of interactions among these factors. Data were derived from nine-year (2016–2024) borrowing records of H-category books (language and philology) from the Library of Nanjing Normal University, encompassing a sample of 15,312 unique readers, 27,151 distinct books, and 129,643 valid borrowing transactions. Principal component analysis (PCA) was utilized to extract two key factors: TSI and Spatial Interest (SI) factor. SPSS PROCESS Model 4 was then employed to test the mediating effect of interest category scope. The results indicate that interest category scope exerts a partial mediating effect on the relationship between the TSI factor and total borrowing volume—with the indirect effect accounting for approximately 10.5% of the total effect, which was validated through bootstrap analysis. Notable differences in reading preferences were observed across reader groups: undergraduate students prioritize practical foreign language learning (corresponding to H3 category), graduate students emphasize theoretical linguistics (H0 category) and advanced Chinese studies (H1 category), while staff members demonstrate scattered interests in applied and interdisciplinary areas. Subject word clustering analysis identified eight core academic categories (e.g., language teaching, literary studies, historical linguistics), shedding light on the thematic focuses and interdisciplinary

connections within language and literature research. This study contributes to a deeper understanding of how time, space, and interest interact to shape reading behaviors. It also provides actionable insights for library resource management, the optimization of reader services, and the design of academic research in the domains of language and literature.

Keywords: time-space-interest (TSI) factor, reading behavior, interest category scope, mediation effect, language and literature books, subject word analysis

1. Introduction

1.1 Introduce the Problem

Reading behavior in language and literature is a dynamic interplay of individual cognitive processes and contextual stimuli, shaped by multifaceted factors that modulate how readers engage with textual content. Contemporary scholarship has increasingly unpacked the roles of temporal dynamics, spatial configurations, and interest mechanisms as discrete yet interconnected influencers of reading engagement and outcomes. Temporal factors, ranging from momentary processing rhythms to long-term behavioral consistency, exert profound effects: L2 readers undergo measurable shifts in lexical processing strategies over academic semesters (Schmidtke & Moro, 2021), while regular engagement with vocabulary-rich text messages enhances long-term retention compared to sporadic exposure (Li & Deng, 2018). Serial rapid automatized naming further structures temporal fluency, with articulation rate mediating reading efficiency across age groups (Georgiou & Parrila, 2020), and even advanced multilingual learners exhibit persistent L1-derived delays in semantic processing (Williams, 2018). These findings collectively highlight time as a foundational dimension of reading behavior, governing both immediate processing and long-term skill development.

Complementing temporal dynamics, spatial and environmental factors shape how readers physically and cognitively interact with text. Spatial formatting directly influences accessibility and processing: in-line glosses increase text regressions and target word recognition for ESL learners (Sulaiman, 2023), while light green digital backgrounds reduce visual fatigue and improve L1 reading performance (Li et al., 2025). Digital contexts introduce additional spatial complexities, as AI tools alter interaction patterns through feedback layout (Khoudri, 2024) and multilingual LLM use creates cross-linguistic spatial-choice interference (Biswas et al., 2025). Even cultural and orthographic spatial schemas matter—dyslexic readers exhibit distinct eye-movement patterns across alphabetic and logographic scripts (Trauzettel-Klosinski et al., 2024), and cross-cultural spatial cues in text layouts modulate interest in speculative reading (Du, 2022). These insights confirm spatial factors as critical determinants of how readers navigate and interpret textual information.

Interest mechanisms operate as motivational and directional forces that mediate engagement with reading tasks. Interest categories, spanning academic to recreational domains, shape behavioral choices: reading self-concept differentiates voluntary recreational reading from obligatory academic engagement (Cekiso, 2024), while interest in creative versus technical language modulates revision frequency during L2 translation-reading integration (Swar & Mohsen, 2023). Multiliteracy pedagogy, by aligning classroom spatial environments with real-world literacy practices, expands interest scope in cultural identity-related reading (Aguskin, 2024), underscoring interest as both a driver and outcome of contextualized reading experiences.

Emerging research has begun to explore interactions between these factors, revealing conditional relationships that complicate linear models of influence. L2 proficiency moderates the interplay of temporal and spatial processing: intermediate learners rely on

compensatory slow activation for letter-speech sound integration, while advanced learners exhibit automatic bilateral brain activation (Yan & Seki, 2024). Reading strategy awareness modulates time-space interactions for medium-proficiency L2 readers, enabling strategic adjustment of pace and focus (Maghsoudi, 2022), and gender shapes spatial background effects, with female L2 readers showing greater sensitivity to background color in high-complexity tasks (Li et al., 2025). Interest further intersects with spatial and temporal dimensions: interest category scope mediates the effectiveness of teacher gestures in EFL classrooms (Al-Khresheh, 2025) and moderates gender-space dynamics in mobile reading (Chi, 2023).

Despite these advancements, critical gaps remain in conceptualizing the integrated influence of time-space-interest factors on language and literature reading behaviors—domains characterized by unique demands for interpretive depth, cultural engagement, and aesthetic processing. Existing studies often examine pairwise interactions (e.g., Aryadoust & Foo, 2023's work on proficiency and time-space gaze behavior) or isolate single dimensions, failing to account for how these factors operate as a systemic ensemble. Moreover, interest category scope—defined as the breadth and specificity of readers' interest domains—has been under-theorized as a potential mediator of how temporal and spatial stimuli translate into reading behaviors. While scholars acknowledge interest's role in motivation (Fajt et al., 2024) and task engagement (Delgado-Osorio et al., 2025), its function as a bridging mechanism between contextual factors (time/space) and behavioral outcomes remains unexamined. Finally, few studies have systematically tested how the tripartite interaction of time, space, and interest moderates reading behaviors, particularly in literary contexts where interpretive flexibility and emotional engagement are paramount.

This study addresses these limitations by investigating the integrated influencing mechanisms of time-space-interest factors on language and literature reading behaviors, with a focus on interest category scope as a mediator and their tripartite interaction as a moderator. By integrating insights from cognitive linguistics, educational psychology, and digital humanities, this study centers on six interrelated research questions to unpack the influencing mechanisms of time-space-interest factors on readers' language and literature (H-category) reading behaviors:

Q1: What are the distinct patterns of borrowing preferences in language and literature (H-category books) among undergraduates, graduates, and staff, and how do these patterns align with their respective academic trajectories, professional responsibilities, and learning goals?

Q2: Can hybrid factors—Time-Space-Interest (TSI) and Spatial-Interest (SI)—be extracted from readers' borrowing behaviors of language and literature books? If so, what are the key temporal, spatial, and interest indicators that characterize each factor, and how do these indicators reflect readers' engagement with specific subcategories?

Q3: Does interest category scope play a mediating role in the relationship between the TSI factor and readers' language and literature reading behaviors (measured by total borrowing volume)? If it does, what is the magnitude of this mediation effect, and how do covariates

(e.g., persistent years, renewal behavior, reader type) influence the strength of this mediating pathway?

Q4: What core academic subject clusters emerge from the thematic analysis of language and literature books, and how do these clusters (e.g., language teaching, classical linguistics, cross-cultural communication) reflect the interdisciplinary connections and knowledge gaps within the field?

Q5: How do the TSI and SI factors interact with readers' interest category scope to shape their borrowing behaviors across different academic contexts? Specifically, do spatial preferences and temporal patterns moderate the effect of interest expansion on reading engagement?

Q6: To what extent do the influencing mechanisms of TSI factors on reading behaviors vary across different reader groups (undergraduates, graduates, staff)? For instance, does the TSI factor exert a stronger direct effect on reading volume for graduates compared to undergraduates, and how does this relate to their differing focus on theoretical vs. practical language learning?

1.2 Importance of the Problem

Unlike prior studies that often isolate time, space, or interest as independent variables, this research introduces the TSI hybrid factor—an integrated construct that captures the synergistic interplay between temporal rhythms, spatial environments, and cognitive interests. It examines how the interaction of time, space, and interest moderates behavioral patterns across literary and non-literary texts, addressing the unique demands of language and literature reading that require synthesizing aesthetic, cultural, and semantic information (Marroni, 2023). This framework addresses a critical gap in existing literature, which has largely overlooked the interconnected nature of these dimensions in shaping real-world reading behaviors. This study not only tests the mediating role of interest category scope in the TSI-reading behavior relationship but also explores how covariates (e.g., persistent years) and factor interactions moderate this mechanism. This rigorous analytical design goes beyond descriptive pattern identification, providing causal and conditional insights that strengthen the explanatory power of the proposed model. By examining borrowing patterns across three distinct reader groups (undergraduates, graduates, staff) and linking these patterns to their unique academic or professional contexts, the study moves beyond one-size-fits-all models of reading behavior. This group-specific focus enables nuanced insights into how time-space-interest dynamics vary based on users' developmental stages and functional needs, a perspective rarely emphasized in previous library and information science research.

This study contributes to the reading behavior literature by validating a holistic model that integrates temporal, spatial, and interest dimensions—directly addressing the scholarly call for more comprehensive frameworks capable of reflecting the complexity of real world reading experiences. Furthermore, its identification of core subject clusters within language and literature provides a structured knowledge map of the field, which clarifies interdisciplinary connections and pinpoints knowledge gaps to guide future academic inquiry.

Additionally, by confirming the partial mediating role of interest category scope, the study illuminates the psychological pathway through which environmental factors (time and space) influence reading engagement, effectively bridging the domains of environmental psychology and reading theory. The findings deliver actionable insights for multiple stakeholders in education and library contexts. For academic libraries, they support tailored resource management and spatial optimization to enhance user engagement. For educational practitioners, the focus on time-space-interest configurations informs the design of instructional materials, digital reading tools, and motivational interventions to boost learner engagement with language and literature content. For policymakers in education and library science, the research offers evidence-based resource allocation strategies—prioritizing underrepresented areas identified via subject cluster analysis and investing in context-aware services that leverage time-space-interest dynamics to sustain reading engagement.

2. Previous Research

2.1 Research on the Independent Effects of Time, Space, and Interest Factors on Reading Behavior

2.1.1 Time Factor: Reading Duration, Efficiency, and Long-Term Engagement

Extant research has extensively explored the role of time in shaping reading behavior, with a focus on reading duration, time allocation, and the non-linear relationship between time investment and reading outcomes. Reading time allocation is closely associated with learners' autonomy perception and academic identity. Bayat (2011) found that university students with stronger autonomy—particularly in language responsibility and metacognitive strategy use—spend more time on active reading and achieve better comprehension, indicating that time investment is not random but guided by self-regulated learning processes. Disciplinary and cultural backgrounds influence temporal patterns of scholarly reading: Wang (2010) observed that Taiwanese social science faculty spend approximately 440 hours annually on journal reading, with a preference for older articles and deeper processing of multilingual texts, which differs significantly from the reading time patterns of U.S. scholars.

However, reading time efficiency does not always align with comprehension quality. Koyama and Takeuchi (2008) noted that Japanese EFL learners using electronic dictionaries exhibit higher word look-up frequency and shorter task completion time than those using printed dictionaries, yet the increased reading speed fails to improve comprehension—revealing a disconnection between temporal efficiency and cognitive outcomes. This disconnection is further confirmed by studies on lexical and discourse processing: Paribakht (2005) found that Farsi-speaking EFL students spend more time inferring the meanings of non-lexicalized English words but achieve no higher decoding success due to overfocus on literal meaning; Kim (2001) also reported that Korean EFL students spend extra time summarizing difficult texts but only increase the selection of key ideas rather than transforming information, as the time investment lacks guidance on discourse structure awareness. Additionally, time distribution reflects hierarchical academic needs: Mokhtari and Sheorey (1994) indicated that high-proficiency ESL university students spend more time on academic reading than low-proficiency peers, while graduate students allocate more time to critical reading than

undergraduates, with time investment aligned with discipline-specific knowledge interests.

2.1.2 Space Factor: Digital vs. Print Environments and Cross-Linguistic Spatial Processing

Research on the space factor primarily centers on the comparison between digital and print environments, as well as cross-linguistic/cross-population differences in spatial text processing. Digital spaces offer unique advantages in accessibility and interaction, reshaping reading engagement patterns. Wang (2010) pointed out that Taiwanese social science faculty prefer electronic journals over print versions because digital platforms enable flexible access to multilingual resources, enhancing their willingness for deep reading. Kung (2004) further confirmed that Japanese EFL students in synchronous online discussion spaces show more active reading-related interactions (e.g., initiating discourse, self-correction) than in traditional classrooms, as digital environments reduce anxiety and encourage participation. Virtual spaces also facilitate interdisciplinary connections: Duemer et al. (2002) found that engineering students in online MOO spaces engage in deeper literary discussions by linking literary themes to professional identity, thanks to flexible time-space coordination.

Nevertheless, spatial constraints—whether linguistic, technological, or cognitive—can hinder reading efficiency. For special populations, spatial tools play a critical mediating role: Haptonstall-Nykaza and Schick (2007) demonstrated that deaf students achieve better English print decoding when training combines fingerspelling (a visual-spatial tool) with phonological patterns, as fingerspelling bridges sign language and written text. For multilingual readers, linguistic space affects strategy uses: Clarke (1979) observed that adult Spanish-speaking ESL students employ efficient top-down strategies in L1 reading but revert to bottom-up word-by-word reading in L2, due to limited linguistic proficiency narrowing their focus on global comprehension. Syntactic and orthographic spatial features also impact processing: Kuehnast (2009) noted that Bulgarian readers (including agrammatic patients) process clitic pronouns in different spatial positions with protracted time, with normal readers relying on word order and agrammatic readers compensating with prosodic cues. Oakey (2005) added that non-native English-speaking economics students struggle with academic reading due to unfamiliar phraseological combinations, leading to prolonged reading time and low comprehension regardless of print or digital spaces.

2.1.3 Interest Factor: Interest Category Scope, Preference, and Motivational Mediation

The interest factor is predominantly examined through the lens of interest category scope, which mediates the relationship between individual differences and reading behavior. Narrow interest scope often limits reading depth and strategy diversity, while broad scope promotes adaptive and in-depth processing. Zhang (2010) found that Chinese university EFL students with stronger metacognitive knowledge exhibit a narrow interest scope, focusing only on task-relevant content (e.g., academic vocabulary) and ignoring irrelevant information—though this focus mediates the positive effect of metacognition on comprehension. Conversely, narrow interest can be counterproductive: Porto (2010) reported that Argentine EFL students show limited interest in the cultural "otherness" of Navajo literary texts, focusing only on surface-level exotic elements and forming stereotyped interpretations; Chan (2009) similarly noted that Hong Kong EFL students in self-directed

learning have a narrow interest in vocabulary and accent imitation, restricting their exploration of critical reading strategies.

Interest category scope also shapes specific reading behaviors, such as summarization and source integration. Allen (2004) found that Hong Kong EFL student writers interested in source text integration (rather than mere citation) achieve better reading-to-write performance, as their interest guides them to select information for argument justification. For special populations, targeted interventions can broaden interest scope: Rhoades (2002) demonstrated that deaf children with cochlear implants show higher interest in English print reading when using fingerspelling, as the spatial alignment of handshapes and graphemes broadens their decoding interest and mediates the transition from sign language to print. Kerswill (1995) also noted that British teenagers' interest in linguistic norms moderates their phonological processing—those interested in standard English spend more time adjusting dialectal sounds, while those favoring local dialect ignore such adjustments.

2.2 Research on the Interaction Mechanisms of TSI Factors

2.2.1 Mediation of Interest Category Scope

Interest category scope serves as a key mediator in the relationship between contextual factors (time/space) and reading outcomes, acting as a bridge that translates environmental stimuli into behavioral responses. Broad interest scope enables learners to leverage time and space resources for better performance, while narrow scope limits the utility of such resources. Ibrahim (2009) found that balanced Arabic-English bilinguals outperform English monolinguals in visual-spatial reading tasks, with their broader interest in cross-language processing mediating the effect—bilinguals allocate spatial attention more flexibly due to their interest in cross-linguistic connections. Laufer and Hill (2000) confirmed this in vocabulary learning: EFL learners using CALL dictionaries with multiple lookup options (e.g., translation, sound) show better word retention only if they have a broad interest in multi-dimensional lexical information; those focused solely on translations show no improvement despite frequent lookups. Nishida (1985) further noted that Japanese university students' broad interest in intercultural communication mediates the link between language skills and English reading interactional effectiveness during cross-cultural adjustment.

2.2.2 Moderation of Time-Space and Space-Interest Interactions

The interaction between time and space, as well as between space and interest, moderates the effectiveness of reading interventions and environmental design, highlighting the contextual dependency of reading behavior mechanisms. Time investment enhances the effect of spatial arrangements only when reaching a critical threshold. Şeker and Kömür (2008) found that university students' critical thinking skills moderate the effect of reading space (in-class vs. out-of-class) on questioning behavior: high critical thinking students ask more exploratory questions in out-of-class spaces, but this moderation is stronger when weekly out-of-class reading time exceeds 3 hours. Kamps and Greenwood (2005) similarly reported that at-risk secondary readers in small-group spaces show greater skill growth than those in whole-group spaces, but only if the intervention lasts at least one academic year—long-term time

investment amplifies the spatial grouping effect, especially for students interested in peer scaffolding.

Space-Interest interaction determines whether environmental design aligns with learner needs, with mismatches leading to reduced engagement. Stokes and Martin (2008) observed a perception gap between tutors and students regarding reading list use: students prefer digital lists for quick access, while tutors favor print lists for structure. This mismatch reduces students' deep reading interest unless their interest category scope is aligned (e.g., selecting digital materials related to their research interests). Clarke and Silberstein (1977) also noted that psycholinguistic-based classrooms (emphasizing autonomy) improve ESL reading skills only for students interested in self-directed learning; those with low autonomy interest benefit more from teacher guidance in physical spaces.

2.3 Cross-Cutting Research: Cultural Context as a Moderator

Cultural context acts as a cross-cutting moderator that shapes the interplay between time, space, interest, and reading behavior, reflecting the socio-historical embeddedness of reading practices. Historical and linguistic cultural contexts influence temporal processing and interpretive biases. Zunshine (2010) analyzed 18th-century English fiction and found that readers and writers shared a tacit understanding of body language as both valuable and unreliable—this cultural context moderates the interaction between interest in character psychology and reading duration, as activated interest in literary theory of mind leads readers to spend more time analyzing character gestures. Barman (2004) similarly revealed that male readers of 19th-century British colonial texts, driven by a narrow interest in patriarchal norms, spent more time on accounts stereotyping Indigenous women, with the colonial cultural space amplifying the link between reading time and biased interpretation.

Linguistic cultural differences also moderate spatial and temporal semantic processing. Szabolcsi and Haddican (2004) compared Hungarian and English readers' processing of negated conjunctions: Hungarian readers, influenced by cultural emphasis on collective meaning, spend less time interpreting "neither" readings (due to plural-like conjunction behavior), while English readers, focused on distributive meaning, take more time. Zhang (2010) added that Chinese EFL students' interest in academic reading moderates the cross-temporal transfer of L1 reading strategies to L2, with successful learners narrowing their interest to task-specific strategies (e.g., discourse analysis) to optimize long-term transfer—reflecting the moderating role of cultural linguistic habits.

2.4 Critical Review of Previous Research and Research Gaps

Existing research has made significant contributions to understanding the role of time, space, and interest in reading behavior, yet several critical gaps remain, underscoring the need for the current study.

First, research on factor independence dominates, while integrated exploration of TSI interplay is insufficient. Most studies focus on single factors or binary interactions, but few systematically examine the tripartite dynamic between time, space, and interest. The complex TSI synergy that shapes real-world reading behavior—such as how temporal regularity

interacts with spatial environment to expand interest scope—has not been fully unpacked.

Second, the conceptualization and measurement of interest category scope lack uniformity and depth. While studies acknowledge its mediating role, they often define interest scope based on single dimensions without capturing its multidimensionality. Additionally, few studies explore how time and space jointly shape interest category scope—for example, whether long-term engagement in digital multilingual spaces broadens interest scope more than static print spaces.

Third, longitudinal and multi-site studies are scarce, restricting the generalizability of conclusions. Most research relies on cross-sectional data or single-site samples, failing to capture the long-term dynamics of TSI factors and their cross-contextual variability.

Existing research provides a foundational understanding of individual and binary factor effects but falls short of addressing the integrated TSI mechanism, especially in the context of language and literature reading. The current study aims to fill these gaps by systematically exploring the tripartite interplay of time, space, and interest, clarifying the mediating role of interest category scope, and examining the moderating effect of their interaction—with a focus on language and literature reading behavior.

3. Data and Method

3.1 Research Sample and Data Source

The research data are derived from the borrowing records of H-category books (language and philology) in the Library of NNU, covering a nine-year period from 2016 to 2024.

Reader dimension: A total of 15,312 unique readers who have borrowed H-category books during the study period are included, ensuring the representativeness of user groups.

Book dimension: The sample covers 27,151 distinct H-category books, encompassing the main types of language and philology literature available in the library.

Borrowing behavior dimension: All valid borrowing transactions are counted, resulting in a total of 129,643 borrowing records that reflect the actual usage of H-category books.

The data are preprocessed to exclude invalid entries (e.g., duplicate records, incomplete borrowing information) before formal analysis, ensuring data accuracy and reliability.

3.2 Research Process

As illustrated in Figure 1, the research design is constructed around the library book borrowing data spanning from 2016 to 2024, and adopts regression analysis as the core methodological approach to explore the intrinsic relationships between relevant variables. The dataset covers a comprehensive range of data fields, including reader ID, personal attributes (e.g., gender, age), borrowing time, book categories (such as H0, H1, etc.), and annual borrowing frequency, thereby forming a multi-dimensional data structure integrating TSI.

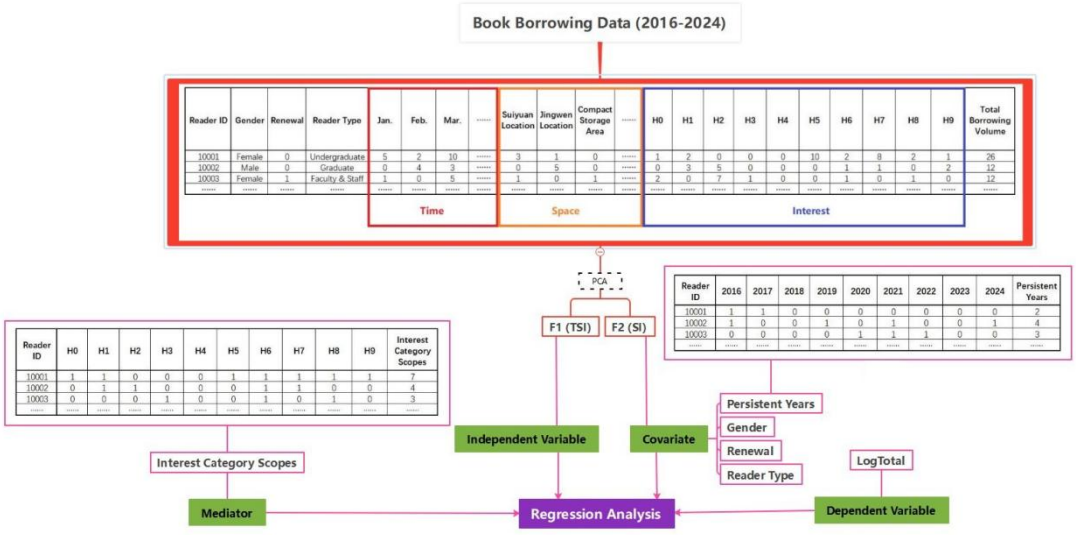

Figure 1. Research design

3.2.1 Factor Extraction

The variables related to time (e.g., Jan, Feb, Mar…), space (e.g., Region, Campus Area…), and interest (e.g., H1, H2, H3… H9) are properly entered into SPSS. Go to Analyze, Dimension Reduction, with Principal Component Analysis (PCA) as the extraction method and Quartimax with Kaiser Normalization as the rotation method. In the PCA dialog box, move the time, space, and interest variables into the Variables list. Click Continue. Click OK to run the analysis. SPSS will generate outputs including: How much variance of each variable is explained by the extracted factors, the eigenvalue and cumulative variance explained by each factor, the loading of each variable on the rotated factors, helping identify which factors (related to time, space, or interest) each variable belongs to. This process extracts common factors from time, space, and interest variables, with Quartimax rotation (normalized by Kaiser) enhancing factor interpretability by simplifying factor structures.

3.2.2 Mediation Effect Model

This study employed PROCESS Model 4 (Hayes, 2022) to examine the mediating role of Interest category scope (mediator, M) in the relationship between TSI factor F1 (independent variable, X) and Total borrowing (dependent variable, Y). SI factor F2, ReaderType, Renewal, Gender, and Persistent years were included as covariates. The analysis was conducted on a sample of 15,312 participants, with 5,000 bootstrap samples used to test the significance of indirect effects (95% confidence intervals, CIs).

3.2.3 Subject Word Analysis

Field 6XX serves as the core field group for delineating the subject content of documents in both CNMARC (China Machine-Readable Cataloging Format) and UNIMARC (Universal Machine-Readable Cataloging Format) pertaining to H-category books borrowed during the period 2016–2024. The visualization is produced using Voyant Tools. Its development hinges on a sequence of interrelated analytical procedures. Initially, the subject terms of

books in Category C borrowed by readers are translated into English and entered into the text box. The input digital texts then undergo preprocessing, encompassing tokenization (to partition the text into individual lexical units) and word frequency enumeration. Subsequently, semantic vectorization techniques—such as word embedding or topic modeling—are employed to transform these lexical units into high-dimensional semantic vectors. These vectors encapsulate the semantic interrelations between words, such that lexemes with analogous meanings are situated in closer proximity within the vector space.

3.3 The Second-Level Classification of Category H

The second-level classification of Category H (Language and Linguistics) in the CLC systematically organizes content into two core dimensions: general linguistics theory and methodology and specific language families/languages. It covers theoretical exploration, disciplinary intersections, and practical applications of linguistics, while comprehensively categorizing Chinese (including Han and ethnic minority languages), foreign languages, and international auxiliary languages.

H0 Linguistics (General Linguistics): This category focuses on the foundational theories, methodologies, and universal research fields of linguistics, serving as the theoretical framework for the entire H category. Includes H0-0 (Language Theory and Methodology), which covers interdisciplinary relationships (H0-05), linguistic schools and theories (H0-06), and the history of linguistics (H0-09). It also encompasses language planning (H002), language classification (H003), and language distribution (H004). Covers specialized areas such as phonetics (H01, including phonemics, experimental phonetics), graphology (H02, including writing systems and orthography), semantics/pragmatics/lexicology (H03), syntax (H04), stylistics/rhetoric (H05), translation studies (H059), lexicography (H06), dialectology (H07), applied linguistics (H08, including machine translation and mathematical linguistics), and language teaching (H09).

H1 Chinese (Han Language): This category centers on the study of the Han Chinese language, with a structure parallel to H0 but focused exclusively on Chinese, emphasizing historical evolution and standardization. Includes H1-0 (Chinese Theory and Methodology, covering policies and the history of Chinese linguistics) and language standardization (H102, e.g., promoting Mandarin). It classifies Chinese by historical periods: ancient Chinese (H109.2), medieval Chinese (H109.3), and modern Chinese (H109.4). Covers Chinese phonetics (H11, by historical periods), Chinese graphology (H12, including ancient characters and character simplification), semantics/lexicology (H13, including exegesis), syntax (H14), stylistics/rhetoric (H15), translation (H159), lexicography (H16, including dictionaries like Shuowen Jiezi), dialectology (H17, covering Mandarin, Wu, Yue, and other dialects), and Chinese teaching (H19, including TCFL).

H2 Chinese Ethnic Minority Languages: This category systematically categorizes languages of China's ethnic minorities, with a focus on individual language groups based on ethnic and linguistic affiliations. Includes over 50 specific minority languages, such as Mongolian (H212), Tibetan (H214), Uyghur (H215), Miao (H216), Yi (H217), Zhuang (H218), Korean (H219), Manchu (H221), and others. It also includes ancient minority

languages (H211) and unclassified minority languages (H289). Organizes languages by ethnic groups, ensuring comprehensive coverage of China's officially recognized minority languages and their research fields.

H3 Commonly Used Foreign Languages: This category targets foreign languages widely used in China, with detailed subcategories for each language, following a structure similar to H1 (focused on practical application and teaching). The most detailed subcategory, covering non-standard English (H310.1), proficiency tests (H310.4), phonetics (H311), graphology (H312), lexicology (H313), syntax (H314), writing/rhetoric (H315), translation (H315.9), lexicography (H316), dialects (H317), and teaching (H319). Other Commonly Used Languages: Includes French (H32), German (H33), Spanish (H34), Russian (H35), Japanese (H36), and Arabic (H37), each with subcategories for core linguistic elements and teaching.

H4–H8 Language Families: This section classifies languages worldwide by their genetic relationships (language families), covering major language families across Asia, Europe, Africa, the Americas, and Oceania. Includes Sino-Tibetan (H4, e.g., Thai, Burmese), Altaic (H5, e.g., Turkish, Mongolian), Austroasiatic (H61, e.g., Khmer), Dravidian (H62, e.g., Tamil), Austronesian (H63, e.g., Indonesian), Northeast Asian languages (H64), and Caucasian (H65). Focuses on Indo-European (H7), the largest subcategory, covering Indo-Aryan (H71, e.g., Hindi), Iranian (H73, e.g., Persian), Slavic (H74, e.g., Russian), Germanic (H76, e.g., English), Romance (H77, e.g., French), and Celtic (H78) branches. Includes African languages (H81, e.g., Niger-Congo), American languages (H83, e.g., Nahuatl), and Oceanic languages (H84).

H9 International Auxiliary Languages: This category covers constructed languages designed for cross-cultural communication, focusing on major international auxiliary languages. Includes Esperanto (H91), Volapük (H92), Occidental (H93), Ido (H94), and other international auxiliary languages (H95). Reflects the practical need for standardized cross-linguistic communication tools in global contexts.

Figure 2 presents the lending distribution of Category H books' second classification in NNU. There is a significant disparity in total circulation among different second classifications. H3 has the highest circulation, approaching 60,000, followed by H1 with around 43,000 and H0 with approximately 26,000. In sharp contrast, H2, H4 to H9 have extremely low circulation, with H2 nearly zero and H4 to H9 mostly close to zero, except for a small amount in H5. This distribution shows a prominent polarization, where H1 and H3 are highly favored by readers, while the other classifications receive negligible attention. Such a pattern implies that the knowledge areas or themes corresponding to H1 and H3 have strong demand, while those of H2, H4 to H9 may have limited audience or insufficient resource allocation and promotion.

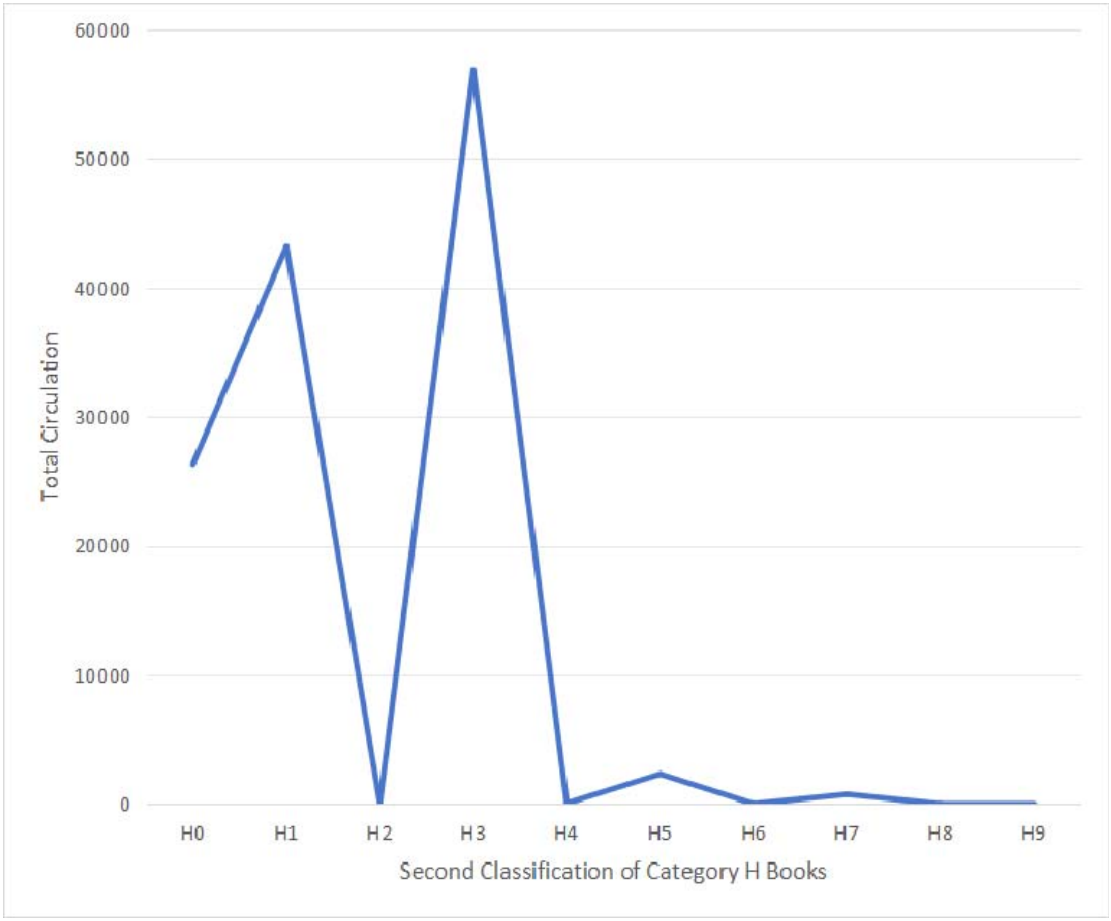

Figure 2. Lending distribution of category H books

4. Result

4.1 The Interests of Different Reader Groups

Figure 3 reveals the borrowing preferences of undergraduates, graduates, and staff across subcategories H0 - H9 (language and linguistics). Undergraduates show a dominant interest in "Commonly Used Foreign Languages (H3)", with a circulation of 35,536 (accounting for 62.5% of H3's total). This aligns with practical language-learning needs, especially for English (the most detailed subcategory in H3, covering proficiency tests, phonetics, and teaching). They also borrow moderately from "Linguistics (General Linguistics, H0)" (8,256 circulations, 31.3%) and "Chinese (Han Language, H1)" (11,392 circulations, 26.4%), reflecting foundational and native-language studies.

Graduates demonstrate a broader engagement with theoretical and specialized fields. They have substantial borrowing in "Commonly Used Foreign Languages (H3)" (17,741 circulations, 31.2%) but also show strong interest in "Linguistics (General Linguistics, H0)" (15,532 circulations, 58.3%) and "Chinese (Han Language, H1)" (27,225 circulations, 63.1%). This suggests graduates focus on advanced theoretical frameworks (e.g., linguistic

schools, methodologies in H0) and in-depth Chinese language studies (e.g., historical evolution, dialectology in H1).

Staff have relatively scattered interests but show notable engagement with "Chinese (Han Language, H1)" (4,512 circulations, 10.5%) and "Linguistics (General Linguistics, H0)" (2,712 circulations, 10.3%). Their borrowing patterns may reflect professional needs related to language teaching, research management, or interdisciplinary collaboration, with less emphasis on large-scale, standardized language learning (unlike undergraduates) or intensive academic specialization (unlike graduates).

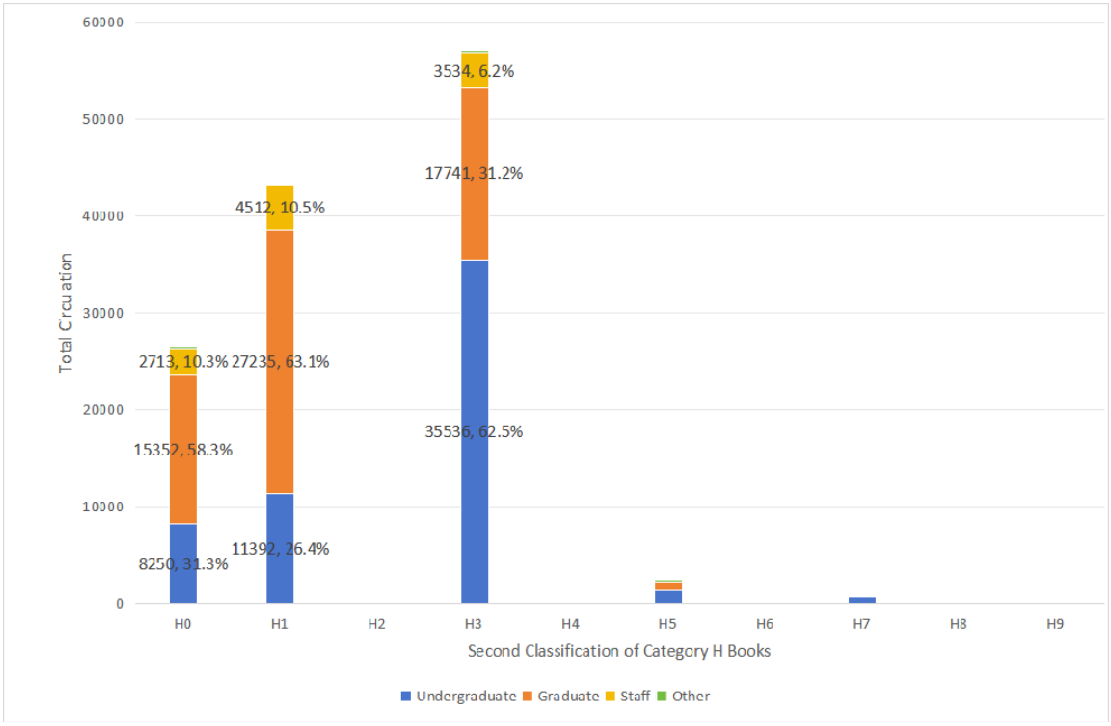

Figure 3. Second classification of category H books borrowed by different types of readers

Undergraduates prioritize practical, widely-used foreign language learning (especially H3). Graduates emphasize theoretical linguistics and advanced Chinese language studies (H0, H1, and H3). Staff focus on applied or interdisciplinary language-related work, with more dispersed borrowing across foundational categories.

4.2 Extraction of Common Factors

Two distinct factors were extracted from the borrowing records of H-language (language and philology) books, with the following characteristics:

4.2.1 TSI Mixed Factor

This factor integrates both temporal and spatial dimensions of readers' borrowing behavior, explaining a significant portion of the total variance.

Spatial Indicators: The Suiyuan Chinese Book Reading Room (factor loading = 0.926) is the core spatial variable, indicating strong reader preference for this location.

Temporal Indicators: All 12 months (January to December) show high factor loadings (ranging from 0.610 for February to 0.824 for March), reflecting consistent temporal patterns in borrowing.

Interest Indicators: Variables H1 (loading = 0.888) and H0 (loading = 0.649) (representing specific borrowing categories) are closely associated with this factor, linking temporal-spatial choices to borrowing quantity.

Table 1. Extracted factors and factor categories

Factor	Items	Factor Category
F1	Suiyuan Chinese Book Reading Room (0.926) H1 (0.888) March (0.824) October (0.807) May (0.785) January (0.769) September (0.765) December (0.765) June (0.761) April (0.743) November (0.707) H0 (0.649) July (0.630) February (0.610)	TSI
F2	H3 (0.808) Jingwen Chinese Book Reading Room (0.741) Jingwen Foreign Language Book Reading Room (0.613)	SI

4.2.2 Factor 2: Spatial Interest (SI) Factor

This factor focuses exclusively on spatial preferences of readers, independent of temporal variations.

Interest Indicator: H3 (loading = 0.808), English-related indicator, has the highest loading.

Spatial Indicators: Jingwen Chinese Book Reading Room (loading = 0.741) and Jingwen Foreign Language Book Reading Room (loading = 0.613) are the primary spatial locations,

showing readers' concentrated interest in the Jingwen-area reading rooms for H-language books.

Readers' H-language book borrowing behavior is primarily driven by two factors: a mixed TSI factor and a pure SI factor. The TSI factor suggests that borrowing activities in the Suiyuan Reading Room are strongly correlated with monthly temporal patterns and specific borrowing volume indicators. The SI factor indicates that the Jingwen-area reading rooms (both Chinese and Foreign Language sections) form an independent spatial preference cluster for H-language book readers.

4.3 Mediation Effect Analysis

4.3.1 Step 1: Regression of Mediator (Interest Category Scope) on Independent Variable (F1)

A multiple linear regression was performed with Interest Category Scope as the outcome variable. The model was statistically significant ($F = 1081.97$, $p < 0.001$), explaining 29.78% of the variance in Interest Category Scope ($R^2 = 0.2978$). F1 had a significant positive effect on Interest Category Scope (unstandardized coefficient, $b = 0.0638$, $SE = 0.0047$, $t = 13.53$, $p < 0.001$, 95% CI = [0.0546, 0.0731]; standardized coefficient, $\beta = 0.1040$).

Table 2. Regression coefficient of mediator on independent variable

	coeff	se	t	p	LLCI	ULCI
Constant	0.7325	0.0248	29.5428	0.0000	0.6839	0.7811
F1	0.0638	0.0047	13.5252	0.0000	0.0546	0.0731
F2	-0.0059	0.0044	-1.3312	0.1831	-0.0145	0.0028
Reader Type	0.0217	0.0077	2.8276	0.0047	0.0067	0.0368
Renewal	-0.1290	0.0222	-5.8036	0.0000	-0.1725	-0.0854
Gender	0.0252	0.0107	2.3619	0.0182	0.0043	0.0461
Persistent Year	0.3575	0.0059	60.7850	0.0000	0.3460	0.3691

Among covariates:

Persistent years showed the strongest positive effect ($b = 0.3575$, $p < 0.001$, $\beta = 0.4872$).

Renewal had a significant negative effect ($b = -0.1290$, $p < 0.001$, $\beta = -0.0396$).

Reader Type ($b = 0.0217$, $p = 0.0047$, $\beta = 0.0195$) and Gender ($b = 0.0252$, $p = 0.0182$, $\beta =$

0.0161) had small but significant positive effects.

F2 had no significant effect (b = -0.0059, p = 0.1831, β = -0.0096).

4.3.2 Step 2: Regression of Dependent Variable (LogTotal) on Independent Variable (F1) and Mediator (Interest Category Scope)

A multiple linear regression was conducted with LogTotal as the outcome variable, including F1, Interest Category Scope, and all covariates. The model exhibited excellent fit ($F = 3242.06$, $p < 0.001$), accounting for 59.72% of the variance in LogTotal ($R^2 = 0.5972$). Mediator (Interest Category Scope) had a significant positive effect on LogTotal (b = 0.2182, SE = 0.0049, t = 44.74, $p < 0.001$, 95% CI = [0.2087, 0.2278]; β = 0.2739). The direct effect of F1 on LogTotal remained significant (b = 0.1182, SE = 0.0029, t = 41.27, $p < 0.001$, 95% CI = [0.1126, 0.1238]; β = 0.2418), indicating a potential partial mediation. All covariates had significant positive effects on LogTotal (all $p < 0.001$), with Persistent years showing the strongest influence (b = 0.2294, β = 0.3922).

The interaction between F1 and Interest Category Scope on LogTotal was statistically significant ($F = 1604.32$, $p < 0.001$), suggesting that the effect of F1 on LogTotal varies with the level of Interest Category Scope.

Table 3. Regression coefficient of dependent variable on independent variable and mediator

	coeff	se	t	p	LLCI	ULCI
Constant	-0.2277	0.0154	-14.8028	0.0000	-0.2579	-0.1976
F1	0.1182	0.0029	41.2689	0.0000	0.1126	0.1238
Interest Category Scope	0.2182	0.0049	44.7366	0.0000	0.2087	0.2278
F2	0.0690	0.0027	25.8685	0.0000	0.0637	0.0742
Reader Type	0.0612	0.0046	13.1885	0.0000	0.0521	0.0702
Renewal	0.1532	0.0134	11.4092	0.0000	0.1269	0.1795
Gender	0.0411	0.0064	6.3851	0.0000	0.0285	0.0537
Persistent Year	0.2294	0.0040	57.9899	0.0000	0.2216	0.2371

4.3.3 Step 3: Total, Direct, and Indirect Effects

The total effect of F1 on LogTotal was significant (b = 0.1321, SE = 0.0030, t = 43.64, p <

0.001, 95% CI = [0.1262, 0.1381]; standardized β = 0.2703). As reported in Section 4.3.2, the direct effect of F1 on LogTotal was significant (b = 0.1182, p < 0.001, 95% CI = [0.1126, 0.1238]; β = 0.2418). The indirect effect of F1 on LogTotal as mediated by Interest Category Scope was examined using 5,000 bootstrap samples. The unstandardized indirect effect was significant (b = 0.0139, BootSE = 0.0089, 95% BootCI = [0.0044, 0.0366]; CI did not include 0). The completely standardized indirect effect was also significant (b = 0.0285, BootSE = 0.0109, 95% BootCI = [0.0120, 0.0523]). The indirect effect accounted for approximately 10.5% of the total effect (0.0139 / 0.1321 ≈ 0.105), confirming a partial mediation role of Interest Category Scope (see Figure 4).

Table 4. Regression coefficient of total effects

	coeff	se	t	p	LLCI	ULCI
Constant	-0.0679	0.0159	-4.2656	0.0000	-0.0991	-0.0367
F1	0.1321	0.0030	43.6413	0.0000	0.1262	0.1381
F2	0.0677	0.0028	23.8762	0.0000	0.0621	0.0732
Reader Type	0.0659	0.0049	13.3676	0.0000	0.0562	0.0756
Renewal	0.1250	0.0143	8.7677	0.0000	0.0971	0.1530
Gender	0.0466	0.0068	6.8090	0.0000	0.0332	0.0600
Persistent Year	0.3074	0.0038	81.4340	0.0000	0.3000	0.3148

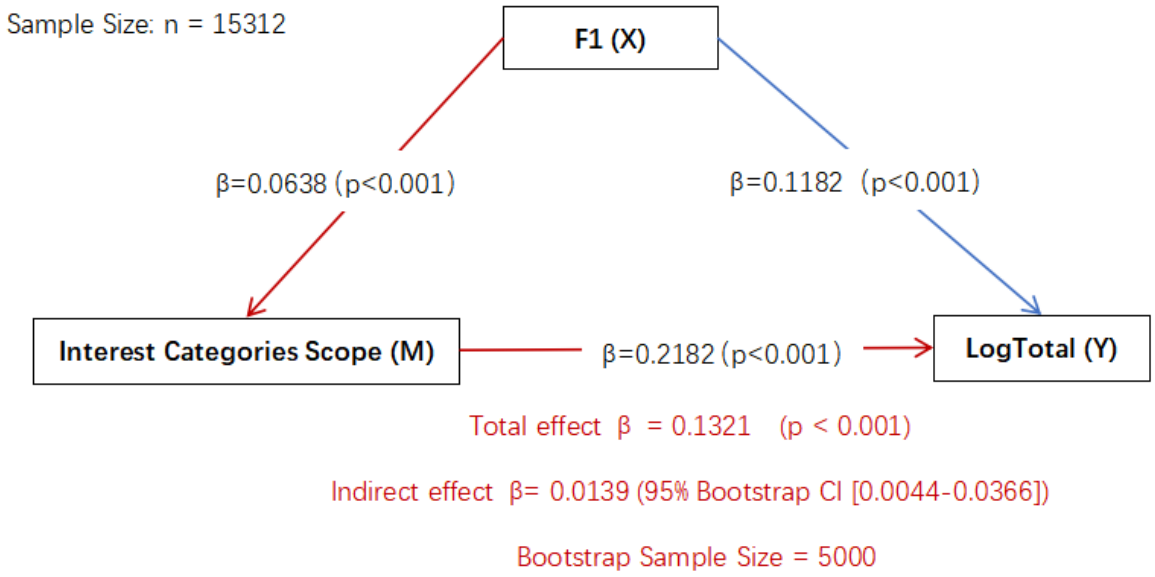

Figure 4. Mediation model of F1on LogTotal with Interest Categories Scope as Mediator

4.4 Subject Word Clusters

The thematic words of language and literature books have been categorized into 8 core academic categories. Figure 5 presents the top 96 high-frequency subject terms. The larger the font size of a term in the word cloud, the higher its frequency of occurrence in the research text. This can directly emphasize the core topics in the H books borrowed.

Figure 5. 96 high frequency subject words

4.4.1 Language Types & Comparison

Focus on different languages, language families, and comparative studies between languages.

Core Terms: English (8541), Chinese (Mandarin) (6309), Japanese (1367), French (501), Russian (348), German (314), Spanish (94), Italian (92), Arabic (10), Portuguese (3)

Chinese Dialects: Wu Dialect (97), Yue Dialect (Cantonese) (27), Min Dialect (10), Gan Dialect (10), Xiang Dialect (17), Jin Dialect (2), Southwest Mandarin (24)

Comparative Studies: Contrastive Study (335), Comparison between English and Chinese (66), Language Comparison (6)

4.4.2 Linguistics & Philology

Cover basic linguistic theories, branches, and classical philological research.

Linguistic Branches: Syntax (224), Semantics (63), Pragmatics (26), Phonetics (7), Phonology (10), Lexicology (18), Morphology (3)

Classical Philology: Exegetics (173), Paleography (86), Chinese Philology (33), Textual Criticism (10), Rhyme Dictionary (29)

Linguistic Theories: Structural Grammar (17), Generative Grammar (3), Functional Linguistics (2), Cognitive Linguistics (8)

4.4.3 Language Teaching & Education

Centered on language teaching practices, educational institutions, and teaching methods.

Teaching Fields: TCSL (Teaching Chinese as a Second Language) (1213), Foreign Language Teaching (132), Second Language Acquisition (131), Bilingual Education (21)

Teaching Skills: Oral English (1121), Writing (1308), Reading (57), Listening (28), Translation & Interpretation (1230 + 245)

Educational Entities: Institutions of Higher Education (4012), Higher Education (340), Normal Universities (38), Primary & Secondary Schools (11 + 3)

Teaching Materials & Methods: Textbook (113), Teaching Methodology (14), Classroom Teaching (83), Audio-Visual Teaching (22)

4.4.4 Language Assessment & Testing

Involve language proficiency tests, examination systems, and assessment methods.

Proficiency Tests: Proficiency Test (914), College English Test (81), IELTS (46), TOEFL (31), Entrance Examination (241)

Assessment Content: Writing Test (12), Vocabulary Test (16), Grammar Test (20), Listening Test (2)

Assessment Methods: Evaluation (23), Qualification Assessment (23), Test Design (42)

4.4.5 Literary Studies & Texts

Focus on literary works, literary genres, and literary translation.

Literary Genres: Novel (28), Long Novel (167), Short Story (30), Poetry (25), Prose (15), Drama (2)

Literary Works: English Novels (40), Chinese Classical Poetry (38), Tang Poetry (15), Song Ci Poetry (4)

Literary Translation: Literary Translation (54), Translation of Literary Works (40), Poetry Translation (2)

4.4.6 Language Elements & Skills

Cover basic language components and language application skills.

Language Elements: Grammar (1532), Vocabulary (1441), Character (Chinese) (811), Phonetics (202), Semantics (63), Syntax (224)

Language Skills: Speaking (1121), Writing (1308), Reading Comprehension (57), Listening Comprehension (28), Interpretation (245)

Lexical Units: Word (89), Phrase (53), Sentence (5), Clause (1), Morpheme (9)

4.4.7 Historical Linguistics & Culture

Involve the historical evolution of language and the relationship between language and culture.

Historical Linguistics: Historical Chinese (33), Medieval Chinese (28), Modern Chinese (447), Linguistic History (140)

Language & Culture: Culture (63), Cultural Exchange (27), Language & Culture Studies (17), Cross-Cultural Communication (2)

Historical Periods: Ancient Times (313), Medieval Times (40), Modern Times (868), Contemporary Times (49)

4.4.8 Applied Linguistics

Focus on the practical application of linguistics in specific fields.

Professional Fields: Business English (5), Legal Language (97), Journalistic Language (12), Tourism English (63)

Technical Applications: Machine Translation (14), Corpus Linguistics (8), Computational Linguistics (2), Natural Language Processing (4)

Applied Writing: Official Document Writing (58), Business Writing (3), Contract Writing (4), News Writing (7)

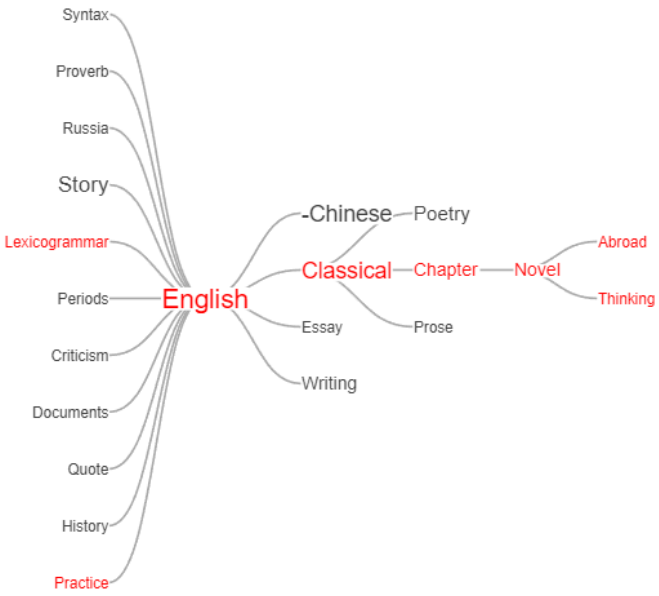

Figure 6. Word tree

Figure 6 illustrates a thematic tree of language-related books, centering on two core themes: English and Classical. For the English branch, it encompasses multiple dimensions of English language and literature studies, including linguistic systems (Syntax, Lexicogrammar), cultural and pragmatic elements (Proverb, Quote, Russia), literary texts and criticism (Story, Documents, Criticism), historical development (Periods, History), and practical application (Practice). Regarding the Classical branch, it covers various literary genres such as Chinese Poetry, Essay, Prose, and Novel, along with elements like Chapter (text structure), and Abroad and Thinking (cross-cultural and ideological dimensions). This thematic tree provides a clear framework for classifying and researching language-related books, spanning English language studies and classical literature analysis.

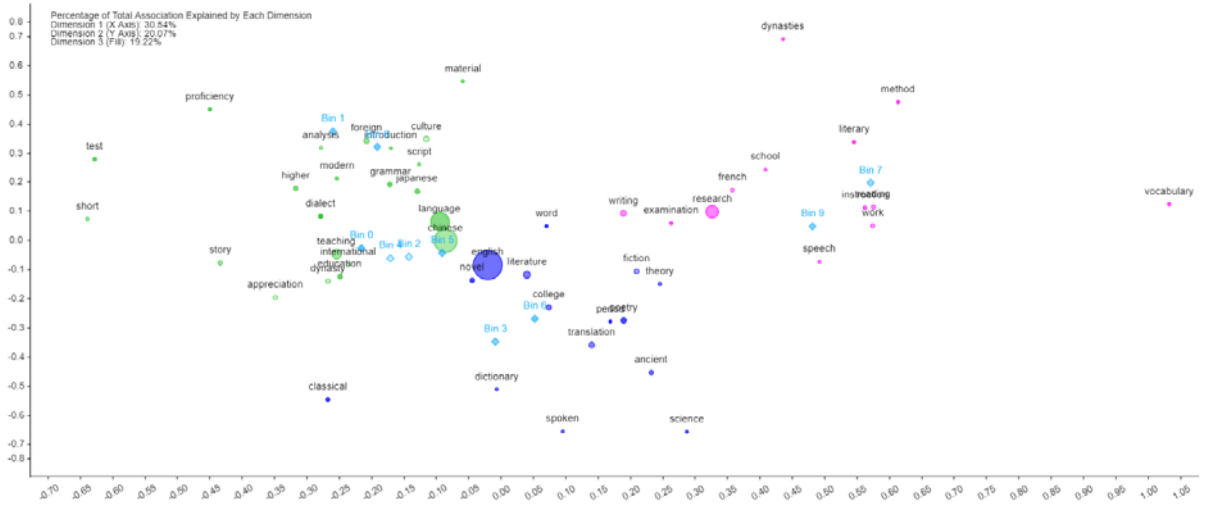

Figure 7. Word Clusters in subject analysis

Figure 7 effectively maps the landscape of subject areas in language and literature studies, revealing clear clusters around language teaching, literary analysis, academic research, foundational skills, classical linguistics, and cross-cultural topics. This visualization aids in identifying research foci, interdisciplinary links, and the structure of knowledge in these fields. Figure 7 identifies distinct clusters based on keyword proximity and thematic coherence:

Cluster 1 Language Teaching & Learning (Light Blue): This cluster focuses on language pedagogy, including teaching methodologies, grammatical analysis, classroom dynamics, and cognitive aspects of language learning.

Cluster 2 Literary Appreciation & Fiction (Green): Centered on literary studies, this cluster emphasizes fiction genres (short stories), literary appreciation, and language proficiency assessments related to literature.

Cluster 3 Research & Academic Analysis (Pink): Focused on academic research practices, including writing skills, examination systems, theoretical frameworks, and institutional contexts (schools, libraries) for research in the humanities.

Cluster 4 Reading & Vocabulary (Light Blue/Pink): Dedicated to foundational language skills, specifically reading comprehension, vocabulary building, and oral speech development.

Cluster 5 Classical & Historical Linguistics (Dark Blue): This cluster spans classical/historical language studies (ancient texts, classical literature), lexical resources (dictionaries), poetic analysis, translation, and interdisciplinary connections to science—suggesting a blend of traditional linguistics and modern applications.

Cluster 6 Cross-Cultural & Specialized Fields (Purple): Highlights cross-cultural and specialized topics, including historical dynasties (likely in literary or linguistic history),

methodological approaches, and foreign language studies (French).

5. Discussion

5.1 Distinct Borrowing Preference Patterns Across Different Reader Groups

Undergraduates prioritize practical foreign language learning (especially "Commonly Used Foreign Languages, H3"), while graduates engage extensively with theoretical linguistics (H0) and advanced Chinese language studies (H1). Staff show scattered interests, focusing on applied or interdisciplinary language-related work. The divergent borrowing preferences across undergraduates, graduates, and staff mirror their distinct academic and professional trajectories. Undergraduates' emphasis on "Commonly Used Foreign Languages (H3)" aligns with institutional mandates for general language proficiency—for instance, English proficiency tests and practical communication skills. This pragmatic orientation echoes Anggia et al.'s (2023) finding that undergraduates' language learning is often driven by instrumental goals tied to academic readiness, where proficiency serves as a foundational tool rather than a subject of theoretical inquiry. In contrast, graduates' deep engagement with "Linguistics (H0)" and "Chinese (H1)" signifies a shift toward specialized, theoretical inquiry, typical of advanced academic training. This aligns with Kuperman's (2025) observation that advanced learners exhibit narrower but deeper interest scopes, focusing on disciplinary core theories rather than surface-level skills. Staff members' scattered interests likely stem from their varied roles in academia, where language resources support both professional tasks and personal scholarly pursuits. This pattern resonates with Cremin et al.'s (2025) research on pre-service teachers, who demonstrate diverse reading motivations shaped by multifaceted professional responsibilities rather than linear academic progression. These findings highlight the need for libraries to tailor collections and services to distinct user groups—for example, curating more practical language materials for undergraduates, expanding theoretical linguistics holdings for graduates, and developing interdisciplinary resource guides for staff.

5.2 Extraction and Characterization of TSI and SI Factors

The TSI factor's integration of temporal, spatial, and interest dimensions illustrates how readers' physical environments and routines shape their engagement with language and literature. The Suiyuan Reading Room's prominence in the TSI factor, paired with consistent monthly borrowing patterns, suggests that this space fosters sustained interaction with foundational linguistic topics (H0, H1). This could be attributed to spatial characteristics that enhance focus, as Li et al. (2025) found that environment-specific design correlates with sustained engagement in discipline-specific reading. Meanwhile, the SI factor's focus on Jingwen Reading Rooms and H3 points to these spaces as hubs for foreign language learning, likely due to concentrated holdings of English textbooks and multimedia resources. This spatial-interest linkage aligns with Liu et al.'s (2025) research on gamified metaverse environments, where spatial concentration of topic-relevant resources strengthens targeted learning engagement. Additionally, the temporal consistency in TSI-related borrowing hints at the role of academic calendars—e.g., peak borrowing in March and October may coincide with semester cycles. This reflects Shimono's (2023) finding that reading behavior is temporally modulated by academic rhythms, with task demands and semester schedules

shaping resource access patterns. These insights imply that libraries can strategically design physical layouts (e.g., zoning reading rooms by subject) and temporal programs (e.g., seasonal themed events in Suiyuan) to amplify engagement with targeted topics.

5.3 The Partial Mediation Role of Interest Category Scope in the Relationship Between the TSI Factor and Reading Behavior

The partial mediation of Interest Category Scope reveals that the TSI factor influences reading behavior not only directly but also by broadening readers' intellectual horizons. When readers interact with diverse temporal-spatial contexts (e.g., visiting Suiyuan across different months), they encounter a wider range of topics (H0, H1), which in turn stimulates more extensive reading. This aligns with Anggia & Habók's (2025) finding that exposure to varied reading contexts expands interest scope, which in turn mediates the relationship between environmental factors and reading engagement—consistent with serendipitous learning theories, where physical and temporal exposure to diverse resources fosters unexpected discoveries. For practice, this suggests that libraries can design pathways that guide readers through interconnected spaces and timeframes—for example, a "linguistic history trail" linking Suiyuan's classical texts with monthly workshops on historical linguistics. Such interventions resonate with Stewart's (2025) research on metacognition-supported reading, where structured contextual exposure enhances interest expansion and deepens reading habits. Additionally, the significant covariates (e.g., persistent years, renewal behavior) highlight the role of reader experience, as Burrows (2016) noted that long-term user engagement with library spaces and resources strengthens responsiveness to context-driven interest expansion.

5.4 Identification of Subject Word Clusters in the Field of Language and Literature

The eight subject clusters provide a diagnostic map of the language and literature field, illuminating both established domains and emerging intersections. For example, the "Classical & Historical Linguistics" cluster's integration of traditional philology and computational methods points to a growing interdisciplinary trend. This echoes Lim et al.'s (2024) research on orthography-phonology consistency, which demonstrates how traditional linguistic inquiry intersects with cognitive science and computational techniques. Similarly, the "Language Teaching & Education" cluster's emphasis on TCSL and second language acquisition reflects global demands for language pedagogy, aligning with Cancino's (2023) finding that topic interest mediates language learning effectiveness, with pedagogy-related clusters driving cross-cultural research collaborations. For libraries, these clusters can inform collection development—e.g., expanding holdings in underrepresented areas like Arabic linguistics. This aligns with Hawatmeh et al.'s (2023) research on Arabic library patrons, who face spatial constraints due to limited digital resources in their native language, highlighting the need to address gaps in underrepresented linguistic domains. Furthermore, the clusters' visual representation enables stakeholders to identify knowledge gaps (e.g., limited resources in Portuguese linguistics) and prioritize investments in high-demand areas (e.g., English language testing). This reflects Yan's (2024) work on text recommendation models, where subject cluster analysis optimizes resource allocation by aligning collections with

field-specific development trends.

6. Conclusion

6.1 Key Findings

This study revealed distinct borrowing preferences among different reader groups. Undergraduates predominantly focused on "Commonly Used Foreign Languages (H3)", which is closely related to their need for general language proficiency in undergraduate education, such as preparing for English proficiency tests and enhancing practical communication skills—consistent with the observation that lower-proficiency learners often prioritize foundational language materials to address immediate academic demands (Murtisari et al., 2024). Graduates, on the other hand, showed a strong interest in both Linguistics (General Linguistics, H0) and Chinese (Han Language, H1), indicating their shift towards specialized and theoretical studies typical of advanced academic training. This aligns with research suggesting that advanced learners' reading behavior is driven by disciplinary specialization, as seen in how graduate-level engagement leans toward theoretical constructs (Pinto et al., 2014). Staff had more scattered interests, mainly concentrated on applied or interdisciplinary language-related work, reflecting their diverse roles in academia—a pattern analogous to how professionals' reading preferences are shaped by multifaceted job responsibilities (Eckstein et al., 2018).

Two significant factors were extracted from the borrowing records. The TSI mixed factor integrated temporal, spatial, and interest dimensions. The Suiyuan Chinese Book Reading Room was a core spatial variable, and all months of the year showed high factor loadings, indicating consistent borrowing patterns. Variables H1 and H0 were closely associated with this factor. This integration of time, space, and interest echoes Wang's (2023) finding that the interaction of temporal flexibility and spatial autonomy shapes learners' reading engagement by aligning with their interest in self-paced learning. The SI factor focused solely on spatial preferences, with H3 having the highest loading and the Jingwen Chinese Book Reading Room and Jingwen Foreign Language Book Reading Room as primary spatial locations. This emphasis on spatial context is supported by Zhang et al.'s (2025) research, which demonstrated that native script experience creates persistent spatial processing biases that influence readers' preference for specific physical reading spaces. These two factors play a crucial role in explaining readers' borrowing behavior, providing insights into how physical environments, routines, and spatial arrangements influence reading choices.

Interest Category Scope played a partial mediation role in the relationship between the TSI factor and reading behavior. The TSI factor not only directly affected reading behavior but also indirectly influenced it by expanding readers' interest category scope—when readers were exposed to diverse temporal-spatial contexts, they encountered a wider range of topics, stimulating more extensive reading. This mediation effect aligns with Zhu et al.'s (2024) conclusion that interest category scope (e.g., task engagement) mediates the link between motivation and reading behavior, as environmental exposure broadens interest and subsequently drives reading engagement. It also resonates with Vetter et al.'s (2017) finding that reflective practices expand interest scope, shifting readers from narrow to broad

engagement. This finding has important implications for libraries and educators, suggesting that designing appropriate spatial-temporal pathways can cultivate deeper and more diversified reading habits.

Eight subject clusters were identified in the language and literature field, covering language types and comparison, linguistics and philology, language teaching and education, language assessment and testing, literary studies and texts, language elements and skills, historical linguistics and culture, and applied linguistics. These clusters provide a comprehensive diagnostic map of the field, highlighting established research domains and emerging interdisciplinary intersections. This structural overview is consistent with Leong et al.'s (2024) analysis of reading strategy use, which showed that disciplinary categories shape the interaction between individual factors, behavior, and environment in reading. It also mirrors Smith et al.'s (2018) findings on how language attitudes and interest categories structure the landscape of language-related reading, helping to understand the current state of the language and literature field, guide research directions, and inform library collection development and user services.

6.2 Theoretical and Practical Implications

This study significantly enriches the existing literature on the intersection of time, space, and interest in reading behavior. By extracting the TSI and SI factors, it provides a new perspective on how readers' physical and temporal contexts influence their reading choices—going beyond previous research that often focused on individual factors in isolation to demonstrate the complex interplay between time, space, and interest. This aligns with Wilcox et al.'s (2024) research, which showed that spatial interaction (mouse movement) and temporal processing (reading speed) jointly shape reading behavior measurement, emphasizing the need to integrate multiple contextual dimensions.

The identification of the partial mediation effect of Interest Category Scope further deepens understanding of reading behavior mechanisms. It shows that the TSI factor's impact on reading is both direct and indirect, mediated by expanded interest scope—aligning with and enriching serendipitous learning theories by highlighting environmental exposure's role in stimulating interest and reading behavior. This complements Bikowski & Casal's (2018) finding that interest in digital tools mediates the link between spatial features and time spent reading, as interest expansion acts as a bridge between context and behavior. Additionally, the analysis of subject word clusters contributes to theoretical understanding of the field's structure and development, revealing established and emerging areas and interdisciplinary intersections—consistent with Chen et al.'s (2020) research on how topic-scanning tools optimize digital reading space by aligning with disciplinary knowledge structures.

For libraries, these findings have several practical implications. In collection development, libraries can tailor collections based on reader group differences: increasing practical foreign language materials for undergraduates, expanding theoretical linguistics and advanced Chinese resources for graduates, and creating interdisciplinary resource guides for staff. In space layout design, the TSI and SI factors guide optimization: zoning reading rooms by subject (e.g., Suiyuan for H0/H1 materials, Jingwen for H3) aligns with Isnin & Mohd

Jaafar's (2021) research that integrated glosses (spatial arrangement) enhance target word attention. Aligning promotions with academic rhythms (e.g., historical linguistics events in Suiyuan during peak months) reflects Hsu et al.'s (2024) finding that optimizing temporal regularity enhances sustained engagement.

For educators, the mediation effect suggests designing progressive learning modules that expand topic exposure—starting from basic skills to theoretical/cultural content—consistent with Maimaiti & Hew's (2025) finding that gamified tasks aligned with interest boost engagement. Using subject clusters to design targeted content echoes Fisher et al.'s (2024) conclusion that flipped learning effectiveness depends on task alignment with interest and spatial flexibility, guiding students to explore diverse language and literature areas.

6.3 Limitations and Future Research Directions

Despite significant insights, limitations exist. The data source was confined to NNU Library, limiting generalizability—similar to Chung et al.'s (2023) note that regional context affects reading behavior, making single-site findings context-specific. Additionally, unconsidered variables (personal hobbies, cultural background, digital reading) may confound results: digital factors, in particular, are critical given Khlaisang & Sukavatee's (2023) finding that mobile-assisted learning environments interact with proficiency to shape engagement, and Munzer et al.'s (2019) observation that digital vs. print reading alters parent-child interaction—factors absent in this study's analysis.

To address the existing limitations of the current research, several promising future directions can be identified. First, longitudinal studies that track reading behavior over an extended period—for instance, monitoring undergraduate students from their freshman to senior year—would be particularly valuable. This approach aligns with Cao's (2024) research, which demonstrates that project-based learning fosters the development of self-regulated reading over time, thereby enabling researchers to capture how factors such as reading interests and time-space constraints evolve alongside students' progression through different academic stages. Second, research focusing on digital spaces is essential to explore how virtual environments interact with the TSI factor. This line of inquiry echoes Woollaston et al.'s (2025) finding that digital contexts significantly shape proficiency-based spatial behavior, as well as Toyokawa et al.'s (2024) observation that technological tools (e.g., augmented reality devices, AR-D) exert a notable influence on learning behaviors—insights that are critical for advancing our understanding of reading practices in the digital age. Third, cross-institutional comparative studies involving multiple libraries can help determine the universality of key influencing factors. This direction resonates with Huang et al.'s (2025) cross-cultural research on shared reading spaces and Anghel & von Davier's (2025) finding that educational systems moderate the effectiveness of reading strategies, ultimately facilitating the development of more generalizable theories in the field.

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