

Research on Language Thought Patterns of Foreign Language Learners: A Critical Review and Future Perspectives

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Abstract: This study focuses on the dynamic constructive mechanisms of Language Thought Patterns (LTP) among foreign language learners and the core challenges therein. As intricate products of the deep-seated interaction between language and cognition, LTP profoundly shape learners' conceptualization processes and habitual modes of logical reasoning. Current research confronts multiple practical dilemmas, including the persistence of L1 cognitive inertia, entrenched thought-path dependencies, and cultural-schematic gulfs, which collectively constrain the development of deeper language competencies. To transcend the limitations of traditional static descriptive approaches, this study proposes employing a mixed-methods research paradigm to critically examine the triple dynamic manifestations of LTP in advanced Chinese learners of English: (1) the semantic mapping pathways of conceptual categorization, (2) the pragmatic presupposition mechanisms underpinning logical inference, and (3) the cognitive-integration modalities of cultural schemas. Through innovative integration of cognitive task analysis, multimodal data-driven experimentation, and neuroscientific techniques, the research prioritizes investigating the catalytic effects of grammatical internalization and metaphoric cognitive automation on qualitative shifts in thought patterns. Furthermore, it seeks to unveil the critical cognitive thresholds characterizing significant milestones in language proficiency advancement. The findings suggest that future LTP research necessitates a theoretical integration of Embodied Cognition, Nonlinear Dynamic Systems Theory, and Complexity Science. Complemented by deep insights gleaned through Artificial Intelligence and immersive virtual scenario experimentation, a multidimensional chain of evidence can be constructed. This integrative framework will facilitate the reconstruction of a phased developmental model of L2 cognition, thereby providing a scientific basis for optimizing cognitive diagnostics and designing adaptive language intervention systems.

Keywords—language thought patterns; foreign language learning; language cognition; conceptual integration; Eye-Tracking

1. INTRODUCTION

Language Thought Patterns (LTP) refer to the integrated cognitive framework, conceptual organizational methods, and logical reasoning habits formed when conducting mental activities in a specific language (Andersen, 2025). From a cognitive linguistic perspective, language is not merely a communicative tool; it fundamentally shapes the way individuals perceive and conceptualize the world (Slobin, 1996). For foreign language learners, the dynamic interaction between native language (L1) thought patterns and target language (L2) thought patterns constitutes a core learning issue: the tension between the entrenched L1 cognitive framework and nascent L2 cognitive paradigms profoundly impacts the accuracy of linguistic output and the depth of conceptual expression. Current research in this domain faces critical challenges, including persistent theoretical debates, ambiguity regarding core mechanisms, and methodological limitations.

As a central interdisciplinary nexus within cognitive science and second language acquisition (SLA) research, LTP significantly influences foreign language learners' conceptualization capacity and depth of cross-cultural cognition. Drawing upon Vygotsky (1978)'s sociocultural theory, language serves not only as an instrument of communication but also as the material carrier of thought; consequently, L2 learners' thought systems undergo a

dynamic process involving deconstruction of L1 frameworks and reconstruction within L2 frameworks. Existing research (Cook, 2016; Treffers-Daller, 2012) indicates that the bilingual mind develops unique conceptual-semantic networks, with thought patterns manifesting composite features of language-dependent encoding and heightened context sensitivity. This underlying mechanism directly influences learners' logical discourse organization, metaphorical processing pathways, and cultural metaphor decoding capacities. Crucially, at advanced proficiency levels, the flexible shifting between thought patterns has emerged as a key indicator distinguishing levels of language mastery (Bylund & Athanasopoulos, 2017). A pressing need exists within the field to move beyond traditional contrastive analysis paradigms and instead construct dynamic explanatory models focusing on dimensions such as cognitive compatibility and the efficacy of conceptual restructuring.

This study focuses on advanced Chinese learners of English, employing a multi-method research design to systematically investigate the tripartite manifestations of their LTP: (1) the semantic mapping trajectories of conceptual categories; (2) the pragmatic presupposition mechanisms underlying logical reasoning; and (3) the cognitive integration modalities of cultural schemas. Distinct from prior primarily descriptive research (e.g., Jarvis & Pavlenko, 2008), the present investigation places particular emphasis on methodological evolution, prevalent constraints, and future

directions, aiming to yield practical pedagogical implications for foreign language instruction.

2. THEORETICAL FOUNDATION

The formation and operation of language thought patterns in foreign language learners are deeply rooted at the intersection of linguistics, psychology, cognitive science, and second language acquisition (SLA) research. Understanding its nature necessitates first clarifying the deep-seated interaction between language and thought – the Language-Thought Interface. A core debate revolves around whether thought exists independently of language or whether linguistic structures fundamentally shape thought processes. Classical Linguistic Relativity, particularly the Sapir-Whorf hypothesis, though not absolute, offers a crucial starting point for examining L2 thought. Its central insight – that the syntactic structures, categories, and metaphorical systems of a particular language shape its speakers' perception, organization, and understanding of the world – remains foundational. The emergence of Cognitive Linguistics (e.g., Lakoff & Johnson (1980)'s Conceptual Metaphor theory) further illuminates the intimate connection between linguistic representations and the underlying conceptual system. It emphasizes that language essentially manifests Embodied Cognition, with cognitive schemas (image schemas, categorization, metaphorical mappings) forming the basis of language comprehension and production. For the foreign language learner, this signifies that learning a new language entails not merely mastering a symbolic system, but also potentially encountering a New Instrument of Thought. An inevitable contact, clash, and even restructuring occur between the learner's inherent first language (L1) patterns and the categories and perspectives embedded within the foreign language (L2). This lays the fundamental philosophical and cognitive groundwork for understanding the unique and complex nature of L2 learners' thought patterns.

The construction and transformation of thought patterns in foreign language learners must be examined within theoretical frameworks emphasizing Cognitive Processing and Dynamic Construction in language acquisition (Sun, et al., 2024). First, Information Processing Theory focuses on how learners handle L2 input and output through mechanisms such as attention, memory, automatization, and controlled processing. Implicit learning and explicit learning shape explicit and implicit knowledge at various levels (e.g., vocabulary, grammar rules), thereby influencing the fluency and accuracy of thought expression. When L2 knowledge is not yet automatized, thought processes rely more heavily on controlled processing, potentially leading to hesitant or non-native-like expression – an external manifestation of thought pattern distinctions in resource allocation. Second, perspectives from Constructivism and Sociocultural Theory (SCT) offer a broader view. Piaget's Schema Theory emphasizes learning as a continuous process of building and modifying cognitive structures through Assimilation and Accommodation (Piaget & Inhelder). Foreign language

learners must integrate new linguistic information into existing schemas (potentially leading to L1 transfer) or adjust and even restructure schemas to accommodate the L2 system. Vygotsky (1978)'s SCT stresses that higher mental functions develop and become internalized through Mediation via symbolic tools, especially language, with social interaction serving as the key catalyst for this development. In the foreign language context, learners using the L2 as a tool for thought and self-regulation within social interaction engage in the process of internalizing a new tool of thought, profoundly reshaping their cognitive and metacognitive strategies. Consequently, a learner's language-mediated thought pattern constitutes a dynamic product of their individual cognitive resources, forms of knowledge representation (e.g., declarative vs. procedural knowledge), and the internalization of symbolic tools through social interaction.

The third layer of theoretical support focuses on the uniqueness, dynamic reorganization, and transfer phenomena inherent in L2 thought patterns. Models of bilingual/multilingual Cognitive Representation (e.g., Kroll & Stewart (1994)'s Revised Hierarchical Model) attempt to explain how L1 and L2 are stored, connected, and accessed within the mental lexicon. The RDHM emphasizes the asymmetrical L2-L1 links and the potential competition or sharing of languages at the conceptual level, suggesting competitive activation of concepts during thought production. More specifically, Linguistic Conceptual Transfer Theory, developed by scholars such as Jarvis and Pavlenko (2008) moves beyond traditional interference paradigms. It posits that the conceptual categories embedded or reinforced by one language (L1 or L2) can transfer in complex ways during the use of the other language, influencing conceptual selection and word choice, constituting Conceptual Transfer. This is not merely a language error, but rather a difference rooted in conceptual-level category choices and conceptualization processes – a core element defining the uniqueness of L2 thought patterns. Furthermore, the L2 Restructuring Hypothesis contends that learners' thought does not simply switch from L1 to L2 mode, but undergoes a dynamic, non-linear process of Conceptual Restructuring or Conceptual Integration. New concepts are incorporated, while existing concepts may be adjusted, suppressed, or even altered in potentially affecting L1 conceptualizations (reverse transfer). Cook (2016)'s concept of Multicompetence goes a step further, proposing that L2 learners ultimately develop not a monolingual L1 or L2 cognitive system, but a unique, Integrated (or Layered) cognitive system. This system possesses a richer Conceptual Repertoire and potentially more flexible modes of thinking than that of monolinguals. Therefore, the language-mediated thought patterns of foreign language learners are the product of continuous interaction, competition, negotiation, and integration between their L1 and L2 conceptual systems, which manifests a dynamic, evolving bilingual/multilingual cognitive construct.

3. EVOLUTION OF METHODOLOGICAL APPROACHES

Researchers have continually attempted to widen the window for gaining insights into internal mental processes through linguistic output, leading to a diversification of methodological pathways.

3.1 Tradition and Refinement of Behavioral Experimental Methods

Behavioral experimental methods constituted the initial and long-dominant research paradigm for investigating the language thought patterns of foreign language learners (Calder et al., 2023). Their core logic derives from behaviorist psychology, focusing on observing, measuring, and analyzing learners' overt behavioral responses to specific linguistic task stimuli to infer underlying cognitive processing mechanisms. In traditional practice, classic experimental paradigms include: (1) Lexical Decision Tasks (LDTs), examining the influence of lexical familiarity and semantic access difficulty on judgment speed; (2) Sentence Comprehension Tasks, employing truth-value judgments, sentence completion, or sentence-picture matching to reveal syntactic and semantic integration mechanisms; (3) Picture Naming and Semantic Priming/Association Tasks, exploring conceptual-semantic networks and retrieval efficiency; and (4) Translation and Code-Switching Tasks, investigating cross-linguistic lexical/conceptual activation and interconnection characteristics. Additionally, the quantitative analysis of pauses and disfluencies (e.g., repairs) in oral production also belongs to the domain of traditional behavioral observation. These studies established preliminary understanding of fundamental cognitive processes in foreign language learning, such as the nature of bilingual lexical representations, features of language transfer, the potential influence of L1 thought on L2 production, and difficulty hierarchies associated with processing specific linguistic structures.

However, traditional paradigms exhibit significant limitations: an over-reliance on single, endpoint response measures, limiting the granular depiction of dynamic, real-time cognitive processing details; often highly structured tasks that deviate from authentic language use contexts, potentially failing to fully reflect thought patterns in naturalistic states; and inadequate capture of individual learner differences manifesting within micro-processes, rendering the revelation of internal cognitive mechanisms driving behavior relatively indirect and constrained.

Confronting these limitations, behavioral experimentation has undergone substantial refinement, propelled by both theoretical advancements and technological progress. The research focus has shifted from isolated external outcomes toward the micro-dynamics of cognitive processing, with enhanced precision and ecological validity achieved through several means: (1) Tool Enhancement and Technological Integration: Incorporating high-precision, high-temporal-resolution techniques like Eye-Tracking. Metrics such as gaze duration, regression paths, and fixation counts capture

attention allocation and information integration during reading, listening, and oral interaction in real-time. (2) Refined Variable Control and Process Parsing: Implementing stricter manipulation of linguistic properties of stimuli and contextual factors while simultaneously refining the analysis of behavioral data itself. This includes separating early (e.g., first fixation duration) and late processing measures (e.g., gaze duration, total viewing time), or analyzing movement tracking data (e.g., deviation area, maximum deviation velocity in mouse-tracking) to identify distinct processing stages and their influencing factors. (3) Ecological and Diversified Task Design: Developing more contextually authentic experimental scenarios and task types, such as embedded tasks, semi-structured dialogues, multimodal information processing tasks, and scenario-based judgment tasks. Concurrently, there is increased focus on continuous discourse analysis within production tasks, aiming to enhance the real-world explanatory power of results while controlling for experimental confounds. (4) Introduction of Novel Behavioral Paradigms: Specific paradigms like Go/No-Go tasks assess linguistic control abilities, while conflict detection paradigms (e.g., Simon task, Flanker tasks) reveal cross-linguistic interference suppression mechanisms. These paradigms allow for more direct operationalization and measurement of core executive functions (e.g., attentional control, inhibitory control) critical to foreign language thinking. (5) Integration of Multiple Data Sources: Transitioning toward multimodal data triangulation within single studies. This entails combining multiple behavioral measures and conducting multivariate analyses incorporating learner background questionnaires, aiming to portray a more comprehensive, multi-dimensional, and individualized picture of foreign language cognitive processing.

This ongoing refinement has significantly augmented the capability of behavioral methods to uncover the dynamic nature, inherent complexity, and substantial individual variation constitutive of language cognition.

3.2 Introspection

As a crucial "window" into the internal cognitive processes of language learners, introspection is deeply rooted in the historical traditions of psychological experimentation and linguistic theory. This methodology originated in the late 19th century with the laboratory introspection conducted by experimental psychologists such as Wilhelm Wundt, positing that conscious content could be accessed through subjects' direct observation and verbal description of their own mental states (Titchener, 1921). Subsequently, Chomsky (1975)'s emphasis on linguistic competence within the framework of generative grammar theory significantly increased linguistics' reliance on introspective methods—particularly linguists' intuitive judgments—arguing for the cognitive reality of speakers' internal intuitions regarding linguistic properties like grammaticality.

Within Applied Linguistics, introspection, specifically in the form of verbal reports with protocols, has been

systematically utilized to directly capture learners' implicit thought processes during language processing. Researchers typically train learners to provide concurrent or retrospective verbal reports, documenting their immediate thoughts during tasks or subsequent reflections related to phenomena such as processing syntactic ambiguity, lexical selection, and error correction. These introspective datasets constitute primary evidence (Faerch & Kasper, 1987) for understanding core cognitive patterns in language learning, including the deployment of L1 knowledge transfer, the construction of interlanguage rule systems, and the activation of monitoring mechanisms. Despite concerns regarding subjectivity, meticulously designed introspective tasks remain an indispensable tool for revealing implicit cognitive pathways.

However, in response to persistent challenges concerning its validity and reliability, introspection within applied linguistics research has undergone substantial adaptations and methodological refinements. On one hand, the research paradigm has evolved from sole reliance on learners' subjective reports towards more rigorous triangulation. This approach cross-validates findings by integrating behavioral data with introspective reports. For instance, when learners report hesitation in L2 expression selection due to L1 interference (Cohen & Brooks-Carson, 2001), concurrent eye-tracking data showing regressive fixations back to the L1 lexical equivalent region significantly corroborates the introspective finding.

On the other hand, specific reporting techniques have been refined. For example, to mitigate the interference caused by concurrent verbal reporting on task performance, researchers increasingly favor after-task cued retrospection. Here, audio or video recordings of the task execution serve as cognitive anchors to assist learners in recalling and reporting their specific thoughts at the time, thereby enhancing report accuracy. More critically, researchers recognize the necessity of carefully designing, implementing, and interpreting introspective data in conjunction with specific language tasks and learner characteristics, including proficiency level, metacognitive ability, and cultural background. While introspection is not a flawless "transparent window", its synergy with other research methods continues to provide a vital pathway for investigating the complex cognitive operations underpinning foreign language learners' linguistic processing.

3.3 Integrating Neuroscience and Psychophysiological Techniques

Early investigations into the language processing modes of foreign language learners primarily relied on behavioral observations, verbal reports, discourse analysis, or cognitive psychology experimental tasks. While these conventional methodologies could characterize representational features of language output and macro-level cognitive processes, they were fundamentally constrained in capturing the transient and intricate neural dynamics and underlying physiological mechanisms involved in the formation and operation of

language processing modes within the brain. A fundamental limitation stems from the susceptibility of verbal reports during cognition to subjective influences and their inherent inability to reflect real-time, unconscious thought processes. While behavioral data offers objectivity, it often fails to disambiguate the precise contributions of distinct cognitive processing stages. Furthermore, traditional experimental tasks are frequently administered within highly simplified, unnatural contexts, raising significant concerns regarding ecological validity. Faced with the fundamental challenge of understanding how neural representations of language processing transition from or coexist within a native language mode to a target language mode, there is an imperative need for advanced techniques capable of directly probing real-time brain activity and physiological responses to overcome these methodological constraints.

The rapid advancement of neuroscience and psychophysiological techniques has provided an unprecedented and powerful arsenal of tools for delineating the neurobiological underpinnings of language processing modes. This paradigm shift centers on the researcher's capacity to directly observe the activation states of cortical regions, temporal dynamics of signal transduction, and fluctuations in associated psychophysiological metrics in learners engaged in linguistic tasks during linguistic tasks.

Specific techniques and their contributions include: (1) Functional Magnetic Resonance Imaging (fMRI): Mapping regional brain activation patterns. (2) Electroencephalography (EEG) / Event-Related Potentials (ERP): Tracking the precise timing (millisecond resolution) of neural responses to specific stimuli. (3) Eye-Tracking (ET): Recording real-time visual attention and processing load during reading or scene viewing. (4) Galvanic Skin Response (GSR) / Heart Rate Variability (HRV): Measuring physiological arousal and autonomic nervous system engagement.

The integration of these advanced neuroimaging and psychophysiological techniques allows researchers to transcend the limitations of behavioral observation, enabling a virtual inspection of the brain as it processes language (Luo et al., 2024). This provides the means to uncover neural markers of language processing mode shifts, identify physiological substrates of individual neuroplasticity, and reveal the neurobiological foundations of how linguistic experience shapes brain structure and function. Consequently, supported by multi-modal evidence base, this approach facilitates the development of more neurophysiologically plausible theoretical models of foreign language processing modes.

3.4 Multimodal Corpus Analysis and Big Data Mining

Traditional methodologies exhibit significant limitations in capturing the dynamic and multi-dimensional thought processes of foreign language learners. Consequently, Multimodal Corpus Analysis has emerged and rapidly developed as a core methodological approach. Its core innovation lies in the systematic collection, annotation, and

analysis of the multiple semiotic resources learners produce during authentic or simulated communication, thereby constructing structured corpora. For instance, research might combine eye-tracking to analyze learners' real-time attentional allocation patterns when processing complex target-language syntactic structures, or utilize kinesics to parse the non-verbal compensatory strategies accompanying difficulties in lexical retrieval, thus uncovering the mechanisms of non-linguistic thought representation within language cognitive load and conceptual restructuring. This paradigm transcends analytical frameworks restricted to linguistic form alone, providing an empirical foundation (Jewitt, 2006; Norris, 2004) for investigating how foreign language thinking manifests through a synergistic "language-body-technology" system.

A further iteration in the technological paradigm, deeply integrated with big-data computational depth, marks the entry of research methodologies into a "Big Data-Driven" stage. Leveraging machine learning and complex network analysis techniques, researchers engage in deep mining of vast-scale, heterogeneous multimodal learner datasets. This aims to identify underlying patterns and regularities in thought processes. For example, Time-alignment analysis of speech, text, and interaction events can automatically detect frequently co-occurring "cognitive rigidity nodes". Sentiment analysis of social media texts combined with micro-expression recognition in videos can quantify "affective-conceptual conflict indices" during learners' conceptual transfer across cultural contexts. Knowledge graph-based modeling of learning pathway evolution can deconstruct the dynamic structural reorganization of individual cognitive networks from a global perspective.

While this approach significantly enhances explanatory power regarding complex cognitive systems, it continues to refine aspects such as algorithmic interpretability and theoretical framework compatibility (Gonzalez & Heidari, 2025).

4. REAL-WORLD CHALLENGES

The construction of a cognitive framework that aligns with the target language represents an arduous and often jarring process of cognitive restructuring for foreign language learners (Cui et al., 2025). During this process, they frequently encounter several profound real-world challenges that constitute significant impediments to mastering authentic expression and the deep-seated cognitive patterns of the target language.

The primary challenge stems from the powerful inertia of native-language thinking patterns and the resultant L1 transfer interference. Learners' cognitive systems are deeply entrenched by their native language (L1), meaning its grammatical structures, expressive conventions, and underlying logical reasoning processes invariably serve as the primary filter for apprehending the new language (L2). When substantial differences exist between the L2 and L1 rules – particularly when learners attempt to transplant deeply

ingrained L1 logical habits into the L2 – it readily generates interlanguage forms such as "Chinglish" or "Japlish". These formations exhibit non-standard syntax, logical incoherence, or misinterpretation. For instance, the pervasive topic-comment structure and reliance on parataxis (context-flow dependent logic rather than explicit connectives) in Chinese often lead Chinese learners to experience confusion with English complex sentence subordination, a scarcity or misuse of logical connectors, exemplifying this dilemma.

Secondly, the L1-dominant cognitive framework establishes a persistent and insidious "cognitive comfort zone". Through years of conditioning, learners become habituated to conceptual categorization, information organization, and even emotional expression via their L1 pathways – a process so fluent as to be largely unconscious. This deep-seated cognitive inertia presents substantial resistance when the target language demands markedly different thought pathways and cognitive operations. For example, learners accustomed to languages emphasizing subject-object dichotomy and explicit logic often perceive communicative constraints and feel alienated when mastering languages like Japanese, which place extreme emphasis on contextual and interpersonal dynamics. They must constantly guard against their ingrained cognitive instincts. This entrenched framework renders the establishment of authentic L2 thinking patterns akin to "rowing against the current".

Furthermore, cognitive models are deeply rooted in cultural experiences, and "cultural absence" inevitably leads to a "perceptual disconnect" concerning core concepts (Fau et al., 2026). Many crucial conceptual categories within a language are not merely lexical items; their rich connotations are intricately woven into specific cultural and social practices. Without authentic immersion within that cultural milieu, foreign language learners, despite grasping literal definitions, will inevitably harbor fuzzy or distorted interpretations of the complex cultural associations, value judgments, and contextual applications underpinning these concepts. Cognitive models cannot be constructed in a vacuum. Profound cultural dissonance constrains the learner's comprehension of the authentic way the target language conceptualizes the world.

These challenges are intricately intertwined, profoundly shaping the trajectory of foreign language acquisition: L1 interference creates observable structural errors, cognitive inertia slows the deeper process of restructuring, and cultural dissociation impedes the essential empathy required for genuine L2 conceptualization (Chuang, 2026). These struggles represent not merely technical hurdles, but also signify a prolonged process of identity and perspective realignment through cognitive negotiation. Therefore, recognizing the nature of these multifaceted challenges is pivotal not only for deciphering linguistic surface structures but also for addressing the deeper imperative of transcending cognitive divides and achieving substantive intercultural convergence.

5. FUTURE DIRECTIONS

Research on the language thinking patterns of foreign language learners is entering a new phase characterized by significant challenges and substantial potential (Zhang & Xu, 2025). Its future trajectory exhibits a robust momentum towards deeper exploration, technological integration, and broader applications.

(1) Core Research Focus. Future investigations must move beyond static descriptions and simplistic categorizations of the external manifestations of thinking patterns. Instead, the primary emphasis will lie in probing the dynamic adaptation mechanisms within learners' internal systems of mental representation. This probe will specifically examine how these systems adapt under varying conditions of cognitive load and task types.

(2) Methodological Innovation. The limitations of relying solely on questionnaires or interviews will be fully recognized. Multi-method approaches will become standard, characterized by multidimensional comparative analysis leveraging AI-powered large-scale dynamic corpora; sophisticated techniques for capturing and analyzing multimodal data; high-precision neurocognitive technologies (e.g., EEG, fMRI); and experiments conducted within high-ecological-validity language immersion scenarios utilizing Virtual Reality (VR) or Augmented Reality (AR). The goal of these integrated methodologies is to construct a comprehensive analytical framework where converging evidence links behavioral observations, physiological responses, and neural activity. This framework aims to capture the fleeting and dynamic nature of cognitive processing.

(3) Interdisciplinary Convergence. Deeper integration with perspectives from embodied cognition theory, nonlinear dynamical systems theory, and complexity science will catalyze the development of sophisticated network-based theoretical models. These models will align more effectively with the inherently discontinuous and emergent nature of thought processes.

(4) Application Domains. Research findings are poised to play a pivotal role in transforming language education paradigms. Specifically, integrated intelligent instructional systems, interacting dynamically with brain-computer interfaces and learning analytics, will enable diagnostic and precise assessment of individual cognitive pathways, alongside real-time adaptive content delivery. These insights will support the development of cognition-friendly teaching materials and the design of adaptive training modules. Concurrently, AI-driven "thinking-persuasion-alignment" language output optimization systems are anticipated to mature. These systems will dynamically perceive and match a user's cognitive characteristics to generate optimally tailored expressions.

Collectively, these advances promise to significantly deepen the theoretical systems of language cognition research and propel teaching practices towards greater precision and

intelligence. Ultimately, they will serve the goals of enhancing human cognitive efficiency and fostering deeper connections across human civilizations.

6. CONCLUSION

Language is not merely a tool for expressing thought; it also fundamentally shapes the architecture of thought at a profound level. The cognitive transformation inherent in foreign language learning constitutes, at its core, a reconfiguration of conceptual systems and cognitive schemas, rather than a simple transfer or replacement of superficial linguistic rules. Current research has made significant strides in unraveling the enigma of "how language shapes thought", particularly elucidating the complexity of bilingual cognitive mechanisms at the neural level. However, it now confronts critical challenges concerning the integration of theoretical frameworks and demands innovative breakthroughs in methodological approaches. Future research must urgently transcend the limitations of singular perspectives and methodologies, moving towards interdisciplinary explorations characterized by greater ecological validity and temporal depth. Only through this approach can research illuminate the processes by which learners' cognitive schemas achieve a dynamic equilibrium, creative synthesis, and sustainable development between their native linguistic/cultural environment and target language culture. Such insights will provide the essential theoretical underpinnings and actionable frameworks necessary for constructing language education systems aimed at cultivating global citizens endowed with cognitive transcendence, expressive versatility, and deep intercultural adaptation capacity.

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