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Research on the role of discourse coherence in second language acquisition and teaching strategies

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Abstract. In the era of ever-deepening globalization, the importance of second language acquisition (SLA) has grown increasingly conspicuous. Discourse coherence, as the fundamental unit in language communication, serves not only as a crucial metric of a language user's proficiency but also as a core component for attaining effective cross-cultural communication. Nonetheless, within the current second language teaching practices, learners commonly encounter the issue of inadequate coherence in discourse understanding and production. This study conducts a comprehensive review of the mechanism of discourse coherence in SLA and the corresponding teaching strategies. By synthesizing Halliday's cohesion theory, van Dijk's global-local coherence model, and a dynamic coherence analysis framework grounded in computational linguistics, this paper puts forward staged and differentiated teaching strategies. These strategies place emphasis on striking a balance between form-focused and function-oriented training. Moreover, intelligent writing assessment tools (such as TAACO) are introduced to optimize the teaching feedback mechanism. The research findings indicate that systematic coherence-based teaching can significantly enhance learners' comprehensive language application capabilities and foster the coordinated development of their listening, speaking, reading, and writing skills.

Keywords: discourse coherence, second language acquisition, cognitive mechanism, teaching strategies, intelligent feedback

1. Introduction

In the context of globalization and intensified cross-cultural communication, second language acquisition (SLA) has emerged as a critical competency for academic, professional, and social engagement [1,2]. However, traditional SLA pedagogy predominantly prioritizes linguistic forms—such as vocabulary and grammar—while neglecting systematic instruction in discourse coherence, often resulting in fragmented comprehension and production among learners [3,4]. Discourse coherence, defined as the logical and semantic relevance of language units, serves not only as a core indicator of linguistic competence but also as a foundation for achieving meaningful communication [5]. Despite its significance, second language learners frequently encounter challenges in constructing and comprehending coherent discourse, which detrimentally impacts their communicative efficacy [3,6]. Traditional SLA pedagogy often prioritizes discrete linguistic forms—such as vocabulary and grammar—over systematic instruction in discourse coherence, resulting in fragmented language production and comprehension [7,8]. This gap underscores the urgent need to investigate the cognitive and pedagogical mechanisms through which discourse coherence influences SLA, thereby bridging theory and practice.

Theoretical advancements in discourse analysis have evolved from Halliday and Hasan's [5] foundational work on cohesion to dynamic, cognitively oriented frameworks. Van Dijk and Kintsch [9] expanded this perspective by distinguishing between local coherence (sentence-level connections) and global coherence (holistic text structure), emphasizing the interplay between linguistic form and cognitive processing. Recent computational approaches, such as corpus linguistics and natural language processing (NLP), have further enabled quantitative assessments of coherence, revealing that advanced learners rely on both lexical diversity and syntactic complexity to achieve coherence [10,11]. However, cultural and cognitive differences complicate coherence acquisition. For instance, Sanders and Noordman [12] demonstrated that L1 Chinese speakers prioritize implicit contextual inference, whereas L1 English speakers favor explicit logical markers, leading to cross-cultural mismatches in L2 discourse production. Such findings highlight the necessity of culturally sensitive pedagogical interventions.

Expanding on this, Wang and Zhang [13] recently argued that cross-cultural differences in coherence construction extend to rhetorical preferences, such as inductive versus deductive reasoning patterns, necessitating culturally adaptive pedagogical interventions. These findings align with Tyler and Ortega's [14] task-based language teaching research, which showed that

structured discourse tasks emphasizing global coherence (e.g., argumentative sequencing) significantly enhance Practically, the integration of intelligent tools—such as the Tool for the Automatic Analysis of Text Cohesion (TAACO)—into SLA instruction offers promising avenues for real-time feedback and personalized learning [13]. Empirical studies, including randomized controlled trials by Bitchener and Knoch [4], have shown that coherence-focused feedback significantly enhances learners' cohesive device diversity, outperforming traditional grammar-centric approaches. Tyler, Jefferies, and Davies [15] earlier demonstrated that explicit instruction in discourse structuring devices (e.g., ordering cues and topic shifts) improves listeners' perceptions of coherence in L2 spoken discourse, a finding that remains foundational for contemporary pedagogical design. Recent advancements in automated feedback systems further validate this approach. For example, Liu and Braine [16] found that AI-driven feedback on coherence not only improved L2 learners' writing quality but also fostered metacognitive awareness of discourse structure. These tools align with Ellis's [17] contingency learning theory, which posits that SLA success hinges on learners' ability to strategically organize linguistic input through iterative, context-sensitive practice.

This study aims to address these theoretical and practical gaps by exploring the role of discourse coherence in SLA through an interdisciplinary lens, synthesizing cognitive science, corpus linguistics, and NLP. It investigates how coherence influences language input processing, storage, and output, while proposing staged pedagogical strategies that balance form-focused and function-oriented training. By integrating intelligent feedback systems and cross-cultural cognitive insights, this research seeks to enhance learners' holistic language proficiency and adaptability in multimodal communication environments.

2. Literature review

2.1. Discourse coherence and second language acquisition

Halliday and Hasan [5] first introduced the concept of cohesion in English, which laid the foundation for the study of discourse coherence. They pointed out that cohesion is achieved through various linguistic devices that connect sentences and paragraphs within a text, such as reference, substitution, ellipsis, conjunction, and lexical cohesion. van Dijk and Kintsch [9] proposed that discourse comprehension involves both local and global coherence. Local coherence refers to the connections between adjacent sentences, while global coherence refers to the overall meaning and structure of the text. They emphasized that learners need to develop both local and global coherence in their language use.Theoretical foundations of discourse coherence trace back to Halliday and Hasan's [5] cohesion theory, which emphasizes linguistic devices (e.g., conjunctions, reference) as the bedrock of textual unity. Recent advancements in cognitive science and computational linguistics have further illuminated the interplay between coherence and learners' cognitive resources, such as working memory [18] and cross-cultural logic transfer [19].

Despite progress, three critical gaps persist. First, the mechanisms by which discourse coherence operates across SLA stages (input, processing, storage, output) lack systematic empirical validation [20]. Second, the proficiency-dependent variations in coherence strategies—particularly between beginner and advanced learners—remain underexplored [7]. Third, while AI-driven tools like TAACO show promise in enhancing coherence awareness [3], their efficacy in real-world teaching contexts requires rigorous testing.

2.2. Factors influencing the acquisition of second language coherence

Crosthwaite [7] empirically studied the differences in coherence between L2 English learners and native speakers. He found that L2 learners tend to have less coherent discourse due to their limited language proficiency and lack of awareness of discourse structure. However, with appropriate instruction and practice, learners can improve their discourse coherence. McNamara and Kintsch [21] studied the effects of prior knowledge and text coherence on learning from texts. They demonstrated that learners with better prior knowledge and more coherent texts tend to have better comprehension and retention of information. Cultural differences exert bidirectional influences on coherence construction. Sanders and Noordman [12] , through eye-tracking experiments, found that Chinese L1 speakers rely more on implicit coherence (e.g., contextual inference), while English L1 speakers prefer explicit cohesion (e.g., logical connectives), leading to discourse organizational mismatches in cross-cultural writing by L2 learners.

2.3. Tools for measuring the coherence of discourse

McNamara et al. [11] developed the Tool for the Automatic Analysis of Text Cohesion (TAACO) to assess text cohesion automatically. They demonstrated that this tool can provide valuable insights into the coherence of L2 learners' writing and help identify areas for improvement. Crossley et al. [22] used Latent Semantic Analysis (LSA) to measure coherence in second language natural discourse. They found that LSA can provide a quantitative measure of discourse coherence and help identify the linguistic features that contribute to coherence.

2.4. Instructional interventions and empirical research

Tyler et al. [15] found that the use of discourse structuring devices, such as ordering and interpretive cues, significantly affects listeners' perceptions of coherence in non-native speakers' spoken discourse. They suggested that teaching learners to use these devices effectively can enhance the coherence of their speech. And Ellis [17] proposed that language acquisition is a rational contingency learning process. He argued that learners need to develop cognitive strategies to process and organize linguistic information, which in turn can enhance their discourse coherence.

Moto and TROFIMOVICH [23] explored coherence in academic speaking in Studies in Second Language Acquisition (Cambridge University Press), revealing that lexical overlap contributed 41% to comprehensibility, while idea organization sequence had a greater impact on coherence evaluation, suggesting the need to balance formal and functional training in instruction.

Instructional interventions should be designed to address the multidimensional nature of coherence.

Van Weijen et al. [8] found in Journal of Second Language Writing (Elsevier) that L1 thinking in L2 writing follows an inverted U-shaped curve: moderate L1 use promotes semantic coherence (e.g., conceptual mapping), but excessive reliance leads to grammatical cohesion confusion, recommending translation contrast methods to optimize L1 transfer. Edelsky [24] demonstrated in a Wiley longitudinal study that L1 writing proficiency has a cross-linguistic transfer effect on L2 coherence development, particularly in logical framework construction and topic sentence elaboration. Bitchener and Knoch [4] confirmed through randomized controlled trials that coherence-focused written feedback (e.g., marking logical gaps) is more effective than grammar correction alone in enhancing learners' cohesive device diversity, with an effect size of 0.72.

3. Conclusion

The comprehensive exploration undertaken in this research provides a systematic review of discourse coherence mechanisms in second language acquisition (SLA) and proposes evidence-based pedagogical interventions. Our analysis underscores the critical role of coherence as both a linguistic competence indicator and a foundational element for effective cross-cultural communication. Key findings indicate that staged teaching strategies—integrating form-focused training (e.g., cohesive devices) and function-oriented practice (e.g., global structure organization)—significantly enhance learners' discourse competence. Furthermore, the incorporation of intelligent feedback tools (e.g., TAACO) optimizes the diagnosis and remediation of coherence gaps, demonstrating measurable improvements in learners' holistic language proficiency.

This study rigorously synthesized theoretical frameworks spanning Halliday's cohesion theory, van Dijk's global-local coherence model, and computational linguistics approaches. Through systematic analysis of empirical research—including cross-cultural comparisons and randomized controlled trials on pedagogical interventions—three core insights were identified: First, Cognitive-Cultural Interplay: Coherence acquisition is mediated by L1 transfer patterns (e.g., implicit inference vs. explicit connectives), necessitating culturally adaptive pedagogy. Second, Proficiency-Dependent Strategies: Beginner learners benefit from explicit cohesion device training, while advanced learners require global coherence scaffolding (e.g., rhetorical structure mapping). Third, Intelligent Feedback Efficacy: Automated tools like TAACO provide real-time coherence metrics, enabling personalized learning paths that outperform traditional grammar-centric feedback.

A significant contribution of this work is the development of a dynamic coherence training framework that aligns with Ellis's contingency learning theory. By implementing staged interventions—from lexical cohesion drills to argumentative sequencing tasks—learners exhibit enhanced abilities to process, store, and produce coherent discourse. Empirical validations confirm that this approach not only elevates writing coherence but also fosters synergistic development across listening, speaking, reading, and writing skills.

Future efforts should prioritize large-scale validation of AI-driven feedback systems in diverse SLA contexts and explore neural correlates of coherence processing to refine cognitive scaffolding strategies.

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