

REVIEW

Theoretical Foundations of Production-Oriented Approach in CET4 Writing Instruction: A Systematic Review of Multi-Theoretical Framework Effects on Writing Performance Dimensions

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ABSTRACT

This systematic review examined the theoretical foundations and effectiveness of multi-theoretical Production-Oriented Approach (POA) integration in CET4 writing instruction, specifically investigating how the coordinated application of Input Hypothesis, Social Constructivism, Cognitive Process Theory, and Sociocultural Theory influences writing performance across five assessment dimensions. Following PRISMA 2020 guidelines, comprehensive database searches identified 420 initial records from Web of Science, Scopus, ERIC, PsycINFO, CNKI, VIP, and Wanfang databases (2015–2024). After systematic screening, 42 studies meeting the inclusion criteria underwent quality assessment and data extraction focusing on theoretical integration patterns, writing performance outcomes, and student engagement moderation effects. Multi-theoretical integration demonstrated superior effectiveness compared to single-theory applications, achieving effect sizes ranging from large effects in content quality ($d = 0.81$) to medium effects in mechanics precision ($d = 0.58$). Student engagement moderation through Self-Determination Theory revealed substantial performance differentials, with high-satisfaction students achieving 167% superior outcomes compared to low-satisfaction counterparts. Temporal analysis confirmed paradigmatic evolution from single-theory dominance (85% in 2015–2017) to multi-theoretical integration prevalence (77% in 2021–2024). Coordinated theoretical integration transcends individual theory limitations while addressing persistent challenges in writing instruction through empirically validated pedagogical frameworks. Findings provide evidence-based

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guidance for CET4 writing pedagogy reform, emphasizing systematic teacher preparation, institutional support mechanisms, and student engagement enhancement strategies essential for successful multi-theoretical implementation.

Keywords: Production-Oriented Approach; Multi-Theoretical Integration; CET4 Writing Instruction; Writing Performance Dimensions; Student Engagement

1. Introduction

The College English Test Band 4 (CET4) is a threshold test within the Chinese higher education system, serving simultaneously as a graduation requirement and as a standard within the employment market for China's undergraduate students. Regardless of extensive curricular exposure to the learning of the English language through formal academic routes, modern pedagogical methods utilized in the instruction of CET4 writing continue to face a multitude of systemic issues that ultimately hamper learner development and the acquisition of genuine communicative competence. The mismatch between conventional instructional methods and academic writing proficiency demands has created disparities in which comprehension skills greatly outweigh productive language proficiency, creating an imperative for pedagogical innovation that integrates theoretical foundations with practical application techniques^[1]. Educational institutions confront substantial obstacles stemming from instructor preparedness deficiencies, where inadequate systematic training protocols, insufficient English for Academic Purposes (EAP) specialized knowledge, and limited exposure to interactive task-based learning environments create pedagogical bottlenecks that compromise instructional effectiveness and perpetuate reliance on outdated teacher-centered methodologies^[2]. The complexity of assessment challenges becomes particularly evident in the measurement and validation of writing assessment strategies, where traditional evaluation frameworks demonstrate concerning temporal delays in feedback provision while maintaining a disproportionate emphasis on grammatical accuracy and mechanical precision at the expense of content creativity, organizational coherence, and argumentative sophistication^[3]. Contemporary research examining large-scale standardized writing assessments reveals that scoring systems significantly impact score variability and reliability, creating systemic barriers to meaningful learner growth and failing to reflect authentic communicative abilities necessary for academic and professional success^[4].

Learner-specific writing barriers compound these institutional challenges through manifestations of heightened composition anxiety, inadequate logical structuring capabilities, persistent first language interference patterns, and diminished academic engagement that collectively reduce learning retention and practical application of acquired skills^[5].

The application of the Production-Oriented Approach (POA) in the classrooms of Chinese English as a Foreign Language (EFL) represents an evolutionary milestone in reconciling the fundamental gap between input and output in conventional language acquisition with the aid of its clear three-stage teaching system. This integrated model is conducive to learning by utilizing clearly outlined and inter-linked stages of motivation, facilitation, and appraisal targeting specific aspects of the comprehension-production gap while also equally developing learner participation, peer interaction, and the acquisition of critical thinking ability^[6]. The theoretical sophistication underlying POA reflects decades of second language acquisition research synthesis, incorporating elements that address both cognitive processing mechanisms and sociocultural dimensions of language learning within authentic communicative contexts that prioritize output-driven task design and strategic input provision^[7]. Current theoretical advances have expanded the POA conceptual model by adding specialized elements designed to resolve modern pedagogical issues. Such issues encompass technology integration, cross-cultural communication skills, and systematic evaluation procedures that align with contemporary academic writing expectations while maintaining cultural responsiveness to Chinese educational environments^[8]. The synthesis of second language learning theory and applied pedagogical practice demonstrates the strength of the POA in bridging the customary academic/practice divide while maintaining theoretical integrity and empirical accountability across different learning environments. This is particularly relevant where simultaneous improvement of linguistic accuracy and communicative fluency is required^[9]. Comprehensive overviews of POA development

reveal its evolution from a primarily output-focused methodology to a more sophisticated framework that acknowledges the complex interplay between input processing, social interaction, and cultural mediation in language acquisition processes, yet the overwhelming majority of empirical investigations examining POA implementation have adopted singular theoretical perspectives, limiting comprehensive understanding of the complex mechanisms through which this approach achieves its documented educational outcomes^[10]. International investigations examining multi-theoretical writing instruction frameworks demonstrate comparable coordination benefits across diverse EFL contexts, with recent metacognitive instruction studies revealing significant improvements through collaborative writing interventions that integrate cognitive and sociocultural theoretical perspectives^[11], while contemporary mixed-methods investigations of self-regulated learning-based instruction validate multi-theoretical effectiveness across varied proficiency levels^[12]. Recent research on online collaborative writing instruction within Chinese EFL learning environments establishes universal principles underlying coordinated theoretical applications that transcend specific cultural and linguistic contexts while maintaining pedagogical responsiveness to local educational requirements and institutional frameworks^[13].

The conceptualization of multi-theoretical integration frameworks represents a critical evolution in understanding complex pedagogical phenomena, where individual theoretical perspectives provide incomplete explanatory power for the multifaceted nature of second language writing development across the five dimensions of content quality, organizational coherence, language accuracy, vocabulary sophistication, and mechanical precision as established through Jacobs' analytical scoring framework. Contemporary scholarship increasingly recognizes the necessity of synthesizing complementary theoretical approaches to achieve more comprehensive understanding of learning processes, particularly within domains requiring simultaneous coordination of linguistic, cognitive, social, and cultural competencies through systematic integration of sociocultural approaches to feedback provision and dynamic assessment methodologies^[14]. The integration of Krashen's Input Hypothesis with social constructivist frameworks creates synergistic effects that extend beyond the sum of individual theoretical contributions, enabling more nuanced analysis of how com-

prehensible input interacts with scaffolded social interaction to facilitate meaningful language acquisition within authentic communicative contexts while addressing previously overlooked motivational and identity factors in second language learning^[15]. Student engagement emerges as a crucial moderating variable within these multi-theoretical frameworks, where Self-Determination Theory provides analytical tools for understanding how learner autonomy, perceived competence, and social relatedness influence the effectiveness of pedagogical interventions across diverse educational contexts, particularly in supporting blended learning environments based on fundamental psychological needs satisfaction^[16]. Research examining engagement mechanisms within technology-enhanced learning environments demonstrates that self-determination theory effectively explains student participation patterns during educational transitions and challenging circumstances, suggesting robust applicability across various instructional modalities while highlighting the moderating functions of social media use and affective learning engagement variables^[17]. The role of engagement in virtual learning contexts becomes particularly significant when considering how technological affordances either enhance or constrain opportunities for meaningful interaction and collaborative knowledge construction, with implications extending to both immediate performance outcomes and long-term skill retention through self-determination theory perspectives that acknowledge learner agency and motivational complexity^[18].

Empirical investigations examining POA implementation reveal significant gaps in current understanding of how theoretical integration affects writing performance across multiple assessment dimensions, particularly regarding the differential impacts of various theoretical combinations on specific aspects of composition quality within tertiary education contexts. Research examining POA's influence on EFL learners' writing performance demonstrates measurable improvements in overall composition quality, yet limited attention has been directed toward understanding how different theoretical foundations contribute to improvements across the five-dimensional framework of content development, organizational coherence, language accuracy, vocabulary sophistication, and mechanical precision that characterizes comprehensive writing assessment in Chinese higher education^[19]. The application of POA principles within En-

English as a Second Language classroom environments reveals context-specific considerations that may influence the relative importance of different theoretical components and their optimal integration strategies for achieving sustained learning outcomes, particularly regarding the coordination between motivating phase task design, enabling phase input provision, and assessing phase feedback mechanisms^[20]. Educational implementations across specialized academic contexts, such as business English instruction targeting both English-major and non-English-major undergraduates, suggest that POA's effectiveness varies according to learner characteristics, disciplinary requirements, and the specific combination of theoretical principles emphasized within particular pedagogical designs, highlighting the need for more nuanced understanding of theoretical interaction effects and their differential impacts on student perception and performance outcomes^[21].

The present investigation addresses the critical problem of theoretical fragmentation in CET4 writing instruction, where isolated applications of individual learning theories fail to address the multifaceted nature of second language writing development despite extensive research documenting POA's potential. The investigation pursues three primary objectives: establishing the current evidence base for multi-theoretical POA applications in CET4 writing instruction, determining differential effectiveness across writing performance dimensions, and elucidating psychological mechanisms underlying theoretical coordination benefits. Based on theoretical foundations and preliminary evidence, this systematic review tests three propositions: multi-theoretical POA integration demonstrates superior effectiveness compared to single-theoretical applications across all writing performance dimensions; student engagement factors significantly moderate the relationship between theoretical integration and writing outcomes; and coordinated theoretical applications create synergistic rather than merely additive effects on CET4 writing competence development. The systematic review addresses three core research questions: (1) What constitutes the current state of evidence regarding multi-theoretical POA applications in CET4 writing instruction contexts? (2) How do different theoretical combinations differentially affect writing performance across content quality, organizational coherence, language accuracy, vocabulary sophistication, and mechanical precision dimensions? (3) What

are the specific mechanisms through which multi-theoretical integration enhances CET4 writing outcomes, particularly considering student engagement moderation effects? The systematic review proceeds through rigorous methodology following PRISMA guidelines (Section 2), comprehensive results analysis examining theoretical integration patterns and performance effects (Section 3), a critical discussion of implications for pedagogical practice and theoretical understanding (Section 4), and synthesized conclusions providing evidence-based recommendations for CET4 writing instruction reform (Section 5).

2. Methods

The methodological framework examines theoretical foundations and multi-theoretical integration effects of Production-Oriented Approach within CET4 writing instruction contexts. CET4 writing instruction represents a critical component of Chinese higher education English language learning, requiring students to demonstrate proficiency across multiple writing dimensions while preparing for standardized assessment affecting millions of learners annually. This investigation follows PRISMA 2020 guidelines while incorporating specialized considerations for CET4 writing instruction research.

2.1. Systematic Review Design for CET4 Writing Instruction Research

The systematic review design specifically targets research examining the theoretical foundations of POA within CET4 writing instruction contexts, recognizing unique pedagogical challenges that require sophisticated theoretical integration approaches. The methodological framework follows PRISMA 2020 standards while incorporating specialized considerations for CET4 writing instruction research, addressing distinctive requirements of preparing students for standardized writing assessment while fostering authentic communicative competence and sustained engagement in English writing tasks. The review protocol will be registered with PROSPERO database upon publication, establishing clear procedures for identifying, evaluating, and synthesizing research evidence related to POA theoretical foundations within CET4 writing instruction environments.

Contemporary CET4 writing instruction faces multiple

pedagogical challenges making multi-theoretical integration particularly relevant, including diverse learner backgrounds, varying English proficiency levels, standardized assessment preparation requirements, and authentic communication skill development within constrained instructional timeframes. The methodological approach employs sophisticated systematic review techniques demonstrating enhanced analytical capabilities through specialized assessment tools and expanded coverage of Chinese EFL writing pedagogy literature^[22]. Quality control measures incorporate dual independent screening and extraction procedures with third-party arbitration, ensuring methodological consistency while maintaining focus on theoretical and practical considerations relevant to CET4 writing instruction contexts, and incorporating considerations for AI-enhanced educational interventions characterizing contemporary CET4 writing instruction practices^[23].

The theoretical foundations examined build upon four pillars: Input Hypothesis for comprehensible input provision, Social Constructivism for collaborative learning support, Cognitive Process Theory for writing strategy development, and Sociocultural Theory for cultural adaptation within Chinese EFL environments. **Figure 1** illustrates the systematic coordination mechanisms through which these four theoretical foundations integrate across POA's three-phase implementation structure.

Figure 1 demonstrates how Input Hypothesis provides comprehensible input exposure during motivation and strategic feedback during assessment, Social Constructivism facilitates collaborative learning throughout all phases, Cognitive Process Theory enables metacognitive development during enabling and reflection during assessment, while Sociocultural Theory ensures cultural relevance and authentic communication contexts across the complete instructional cycle.

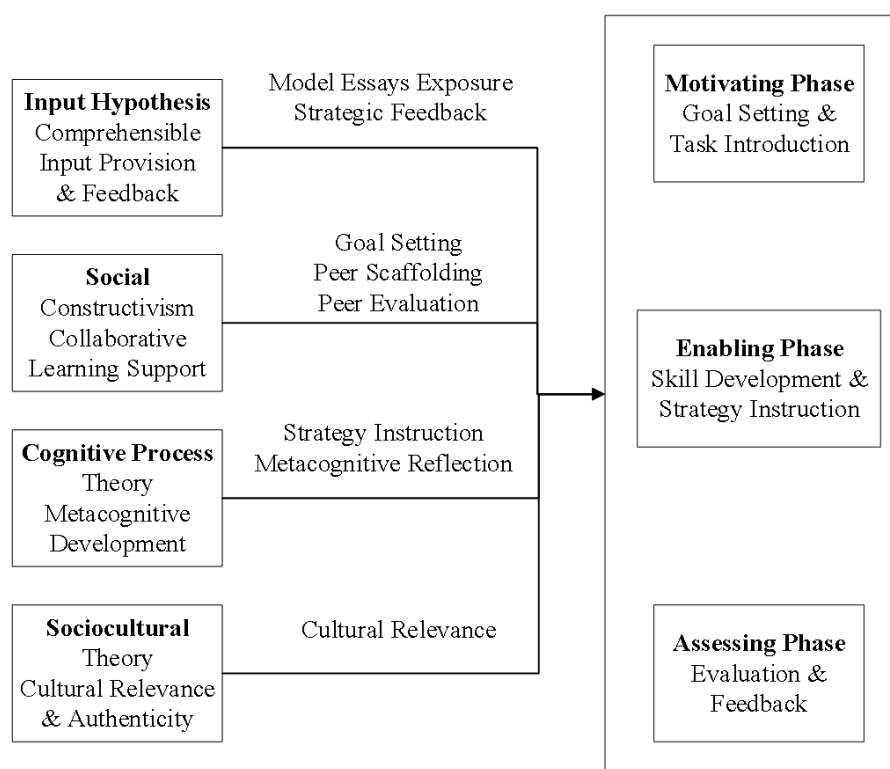


Figure 1. Multi-theoretical Integration Framework in POA Implementation.

2.2. Literature Search Strategy for CET4 Writing Instruction Research

The comprehensive literature search strategy targets research examining POA theoretical foundations within CET4 writing instruction contexts, recognizing the multi-

disciplinary nature spanning linguistic, cultural, and educational domains. Electronic database searches include Web of Science, Scopus, ERIC, and PsycINFO for English-language publications, while Chinese databases encompass CNKI, VIP, and Wanfang ensuring comprehensive coverage within

Chinese educational contexts. The search strategy employs advanced Boolean operators combining controlled vocabulary terms and free-text keywords reflecting distinctive CET4 writing pedagogy terminology across different academic traditions.

Bibliometric analysis techniques enable identification of research trends and theoretical development patterns, utilizing Web of Science Analyzer methodologies to examine citation networks among CET4 writing pedagogy and POA

research communities^[24]. The search incorporates specialized terminology reflecting contemporary developments, including generative artificial intelligence applications and technology-enhanced assessment approaches^[25]. Temporal parameters restrict searches to 2015–2024, encompassing POA's theoretical establishment and recent multi-theoretical integration developments. Database-specific strategies accommodate unique characteristics of CET4 writing instruction research as detailed in **Table 1**.

Table 1. Database-Specific Search Strategies for CET4 Writing Instruction Research.

Database	Search Fields	CET4 Writing Instruction Search Strategy	Results (n)
Web of Science	TS (Topic)	(“Production-Oriented Approach” OR “POA”) AND (“CET4” OR “College English Test” OR “CET-4” OR “CET4 writing”) AND (“writing instruction” OR “writing pedagogy” OR “writing assessment”) AND (“theoretical framework” OR “multi-theoretical”)	89
Scopus	TITLE-ABS-KEY	(“Production-Oriented Approach” OR “POA”) AND (“CET4” OR “College English Test” OR “CET-4” OR “CET4 writing”) AND (“writing instruction” OR “writing pedagogy” OR “writing assessment”) AND (“theoretical framework” OR “multi-theoretical”)	76
ERIC	All Fields	(“Production-Oriented Approach” OR “POA”) AND (“CET4” OR “College English Test” OR “CET-4”) AND (“writing instruction” OR “writing pedagogy”) AND (“theoretical framework” OR “multi-theoretical”)	45
PsycINFO	All Fields	(“Production-Oriented Approach” OR “POA”) AND (“CET4” OR “College English Test” OR “CET-4”) AND (“writing instruction” OR “writing pedagogy”) AND (“theoretical framework” OR “multi-theoretical”)	31
CNKI	Subject	Chinese terms for POA, CET4 writing instruction, theoretical framework, and multi-theoretical integration	78
VIP	Subject	Chinese terms for POA, CET4 writing instruction, theoretical framework, and multi-theoretical integration	56
Wanfang	Subject	Chinese terms for POA, CET4 writing instruction, theoretical framework, and multi-theoretical integration	45
Total	-	CET4 Writing Instruction Focus	420

Note: Search focused specifically on CET4 writing instruction contexts, published 2015–2024. Chinese databases utilized equivalent terminology for CET4 writing instruction, POA theoretical foundations, and multi-theoretical integration approaches.

As illustrated in **Figure 2**, the systematic literature search and selection process demonstrates the methodological rigor employed to identify CET4 writing instruction research while maintaining transparency and replicability standards. The study selection process employs systematic inclusion and exclusion criteria specifically designed to ensure comprehensive coverage of research examining theoretical foundations of POA within CET4 writing instruction contexts, acknowledging the inherent challenges in measuring POA effectiveness within CET4 writing instruction environ-

ments while maintaining methodological rigor and practical relevance for CET4 writing pedagogy^[26].

Figure 2 shows the systematic literature identification and selection process for CET4 writing instruction research, beginning with comprehensive database searches yielding 420 initial records specifically related to POA theoretical foundations within CET4 writing instruction contexts. The diagram illustrates sequential screening phases including duplicate removal ($n = 48$), title and abstract screening focusing on CET4 writing instruction relevance ($n = 372$), full-text

assessment of CET4 writing instruction studies ($n = 78$), and final inclusion of CET4 writing instruction research meeting all criteria ($n = 42$ studies) for both qualitative and systematic synthesis. Exclusion categories demonstrate systematic application of CET4 writing instruction criteria: records excluded during title/abstract screening ($n = 294$) including studies lacking CET4 writing instruction focus ($n = 118$),

insufficient theoretical framework integration within CET4 contexts ($n = 89$), purely theoretical works without CET4 writing instruction data ($n = 56$), and research outside CET4 writing instruction environments ($n = 31$). Full-text articles excluded ($n = 36$) included inadequate multi-theoretical integration ($n = 15$), insufficient writing dimension analysis ($n = 12$), and methodological limitations ($n = 9$).

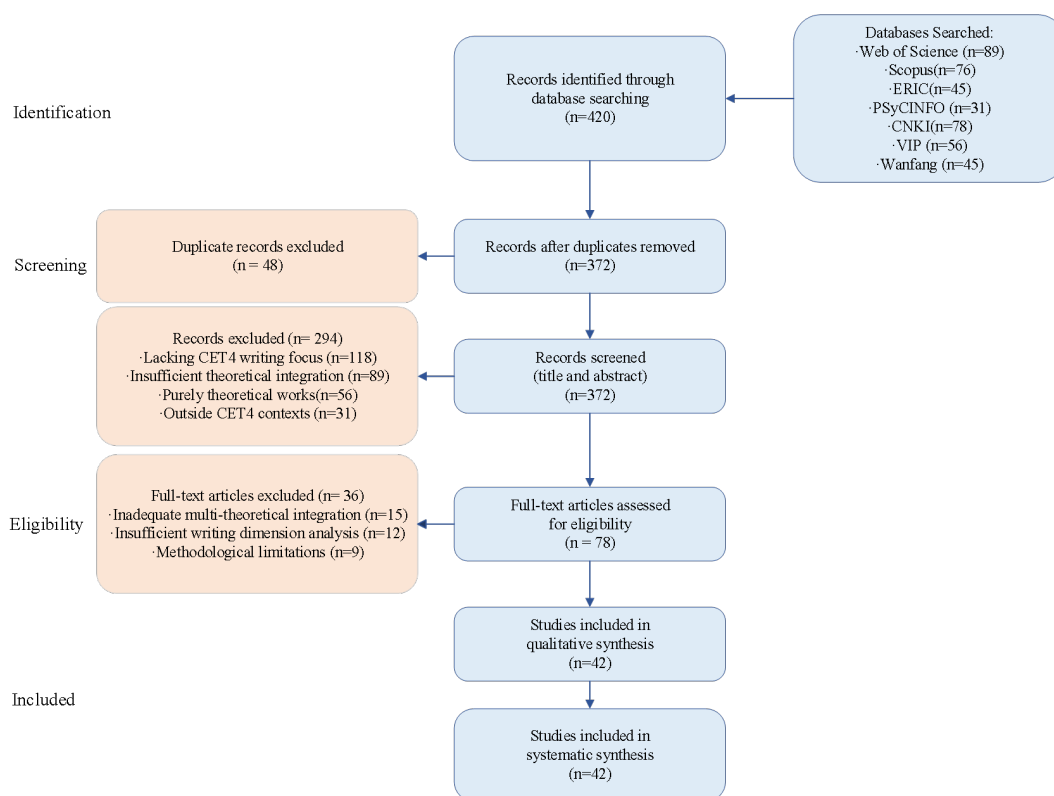


Figure 2. PRISMA Flow Diagram for CET4 Writing Instruction Literature Review.

The eligibility criteria require studies to demonstrate explicit examination of POA theoretical foundations within CET4 writing instruction contexts, with emphasis on research investigating how multiple theoretical frameworks address the unique challenges of CET4 writing pedagogy. Studies must report empirical data regarding CET4 writing performance outcomes across multiple assessment dimensions, incorporate student engagement measurement within CET4 learning contexts, and provide evidence of theoretical integration effectiveness specifically within CET4 writing instruction environments. The experimental design incorporates both symmetric and asymmetric scaffolding approaches specifically adapted for CET4 writing instruction contexts, accommodating diverse CET4 learner needs while maintain-

ing theoretical integrity across different integration conditions within CET4 writing pedagogy frameworks^[27].

2.3. CET4 Writing Instruction Study Quality Assessment and Data Extraction

Quality assessment procedures incorporate established frameworks for evaluating CET4 writing instruction research while integrating specialized considerations for multi-theoretical integration studies within CET4 pedagogical contexts. The assessment process utilizes quality evaluation tools specifically adapted for CET4 writing instruction research, ensuring comprehensive evaluation across diverse CET4 writing pedagogy approaches while maintaining consistency in quality standards relevant to CET4 writing instruc-

tion effectiveness. As demonstrated in **Table 2**, the quality assessment framework encompasses multiple dimensions specifically relevant to CET4 writing instruction research, providing systematic evaluation criteria that address both theoretical sophistication and practical applicability within CET4 writing pedagogy contexts.

Table 2. CET4 Writing Instruction Quality Assessment Framework.

Assessment Domain	CET4 Writing Instruction Evaluation Criteria	Scoring Scale
CET4 Writing Context Relevance	<ul style="list-style-type: none"> Alignment with CET4 writing task requirements CET4 assessment criteria integration Authenticity of CET4 writing instruction context Relevance to CET4 learner needs CET4 writing pedagogy appropriateness 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
Theoretical Framework Integration in CET4	<ul style="list-style-type: none"> POA theoretical foundation clarity in CET4 contexts Multi-theoretical integration within CET4 writing instruction Coherence across POA phases in CET4 pedagogy Theoretical justification for CET4 writing instruction Evidence of theoretical coordination in CET4 environments 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
CET4 Learner Characteristics	<ul style="list-style-type: none"> CET4 proficiency level documentation Demographic representation of CET4 learners Baseline CET4 writing performance assessment Cultural considerations for CET4 instruction Sample representativeness of CET4 population 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
CET4 Writing Instruction Implementation	<ul style="list-style-type: none"> POA three-phase implementation in CET4 contexts Theoretical integration consistency in CET4 instruction CET4 writing task authenticity Material adaptation for CET4 requirements Treatment fidelity in CET4 environments 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
CET4 Writing Performance Measurement	<ul style="list-style-type: none"> Jacobs framework application to CET4 writing CET4 writing dimension assessment accuracy Inter-rater reliability in CET4 writing evaluation Measurement sensitivity to CET4 writing improvement Alignment with CET4 writing standards 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
Student Engagement in CET4 Contexts	<ul style="list-style-type: none"> SDT measurement within CET4 learning environments Engagement-performance relationships in CET4 writing Motivational mechanisms in CET4 instruction Longitudinal engagement tracking in CET4 courses Statistical methods appropriate for CET4 writing data 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
CET4 Writing Data Analysis	<ul style="list-style-type: none"> Effect size reporting for CET4 writing outcomes CET4 writing performance change analysis Confounding variable consideration in CET4 contexts 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate
CET4 Writing Instruction Reporting	<ul style="list-style-type: none"> Methodological detail for CET4 writing instruction Limitation acknowledgment in CET4 contexts Reproducibility information for CET4 writing pedagogy Cultural context description for CET4 instruction 	4 = Excellent, 3 = Good, 2 = Adequate, 1 = Inadequate

CET4 Writing Instruction Quality Classification:

High Quality CET4 Research: ≥ 24 points (75%).

Moderate Quality CET4 Research: 18–23 points (50%–74%).

Low Quality CET4 Research: < 18 points ($< 50\%$).

Note: Each domain scored specifically for CET4 writing instruction relevance. Maximum total score: 32 points across 8 CET4-focused domains.

The data extraction process follows systematic protocols specifically designed to capture comprehensive information regarding theoretical framework implementation within CET4 writing instruction contexts, including CET4 writing performance outcomes, student engagement effects within CET4 learning environments, and contextual factors influencing intervention effectiveness specifically within CET4 writing instruction settings. Specialized attention focuses on extracting detailed information regarding theoretical integration approaches within CET4 writing pedagogy, including

systematic documentation of how Input Hypothesis, Social Constructivism, Cognitive Process Theory, and Sociocultural Theory are combined, implemented, and evaluated within CET4 writing instruction contexts, with particular emphasis on understanding how different theoretical frameworks address the unique challenges of CET4 writing pedagogy and the enabling phase implementation strategies that facilitate theoretical coordination within CET4 writing instruction

environments^[28].

As presented in **Table 3**, the CET4 writing performance dimension extraction protocol provides detailed specifications for capturing outcome data across the five assessment dimensions specifically within CET4 writing instruction contexts, ensuring systematic documentation of theoretical integration effects on CET4 writing competencies while maintaining consistency with CET4 writing assessment standards.

Table 3. CET4 Writing Performance Dimension Data Extraction Protocol.

CET4 Writing Dimension	CET4-Specific Assessment Criteria	CET4 Performance Indicators	Statistical Measures
CET4 Content Quality	<ul style="list-style-type: none"> Ideas development relevant to CET4 topics Argumentation strength for CET4 writing tasks Critical thinking in CET4 contexts Cultural appropriateness for CET4 audiences Topic engagement in CET4 writing scenarios 	CET4 content scoring alignment, topic relevance to CET4 themes, argumentation quality in CET4 contexts	Pre-post means, effect sizes, CET4 content improvement rates
CET4 Organization Structure	<ul style="list-style-type: none"> Logical sequencing for CET4 writing formats Paragraph coherence in CET4 essay structures Transition effectiveness in CET4 writing Overall unity in CET4 writing tasks Structural complexity appropriate for CET4 levels 	CET4 organizational requirements, essay structure alignment, coherence in CET4 formats	Standard deviations, organizational improvement patterns, CET4 structure analysis
CET4 Language Use Accuracy	<ul style="list-style-type: none"> Grammatical correctness in CET4 writing Syntactic variety appropriate for CET4 levels Sentence complexity in CET4 contexts Error frequency in CET4 writing samples Language fluency in CET4 communication 	CET4 language accuracy standards, grammatical proficiency levels, syntactic development	Confidence intervals, error reduction rates, CET4 language accuracy metrics
CET4 Vocabulary Sophistication	<ul style="list-style-type: none"> Lexical diversity in CET4 writing Word choice accuracy for CET4 contexts Academic vocabulary usage in CET4 Collocation appropriateness for CET4 Register awareness in CET4 writing 	CET4 vocabulary expectations, lexical sophistication levels, academic vocabulary integration	P-values, vocabulary development indices, CET4 lexical complexity measures
CET4 Mechanics Precision	<ul style="list-style-type: none"> Spelling accuracy in CET4 writing Punctuation correctness for CET4 standards Capitalization consistency in CET4 contexts Formatting adherence to CET4 requirements Proofreading quality in CET4 writing 	CET4 formatting standards, mechanical accuracy requirements, presentation quality	Mechanical error frequencies, CET4 formatting compliance, precision improvement rates

Note: All dimensions assessed specifically within CET4 writing instruction contexts with alignment to CET4 writing evaluation criteria and performance standards.

2.4. Multi-Theoretical Integration Analysis Framework

The analytical framework examines how four theoretical foundations (Input Hypothesis, Social Constructivism, Cognitive Process Theory, and Sociocultural Theory) coordinate within POA implementation to influence CET4 writing performance across five dimensions (Content, Organization, Language Use, Vocabulary, and Mechanics). This multi-theoretical integration analysis recognizes that POA's effectiveness derives from systematic theoretical coordination

rather than isolated applications. Cross-dimensional integration analysis investigates synergistic effects through POA's three-phase procedure (Motivating, Enabling, Assessing), while student engagement mediation analysis examines how integration operates through autonomy, competence, and relatedness satisfaction^[29].

As demonstrated in **Table 4**, the POA multi-theoretical integration analysis protocol encompasses systematic procedures for identifying, categorizing, and interpreting evidence regarding how the four theoretical foundations coordinate within POA implementation to influence CET4 writing

performance dimensions while considering the moderating effects of student engagement, instructional contexts, and cultural factors specific to Chinese EFL learning environments.

Table 4. POA Multi-theoretical Integration Effects Analysis Protocol.

POA Implementation Context	Theoretical Foundation Integration	CET4 Writing Dimension Effects	Multi-Theoretical Coordination Analysis
POA Motivating Phase Integration	<ul style="list-style-type: none"> • Input Hypothesis: Comprehensible input exposure to create productive demand • Social Constructivism: Collaborative goal-setting and peer motivation • Cognitive Process Theory: Strategic awareness development and metacognitive activation • Sociocultural Theory: Cultural relevance and authentic communication contexts 	<p>Content Quality: Enhanced topic engagement through multi-theoretical motivation</p> <ul style="list-style-type: none"> • Organization: Improved structural planning through strategic awareness • All Dimensions: Increased intrinsic motivation for writing improvement 	Analysis of how four theoretical foundations coordinate within POA motivating phase to enhance CET4 writing engagement and performance preparation
POA Enabling Phase Integration	<ul style="list-style-type: none"> • Input Hypothesis: Scaffolded input provision and guided noticing activities • Social Constructivism: Collaborative learning structures and peer scaffolding • Cognitive Process Theory: Explicit strategy instruction and process modeling • Sociocultural Theory: Cultural adaptation and contextual writing support 	<p>Content Quality: Enhanced idea development through theoretical coordination</p> <ul style="list-style-type: none"> • Organization: Improved coherence through scaffolded structure support • Language Use: Enhanced accuracy through multi-theoretical input processing • Vocabulary: Expanded lexical repertoire through coordinated exposure • Mechanics: Improved precision through strategic attention and peer support 	Analysis of how POA enabling phase coordinates theoretical foundations to provide comprehensive writing skill development across all five dimensions
POA Assessing Phase Integration	<ul style="list-style-type: none"> • Input Hypothesis: Assessment-driven input optimization and feedback integration • Social Constructivism: Collaborative assessment and peer evaluation • Cognitive Process Theory: Self-assessment strategies and metacognitive reflection • Sociocultural Theory: Culturally responsive assessment and authentic evaluation 	<p>Comprehensive Assessment: Multi-dimensional evaluation through theoretical coordination</p> <ul style="list-style-type: none"> • Sustained Development: Long-term writing improvement through integrated assessment • Self-regulation: Enhanced learner autonomy through coordinated evaluation approaches 	Analysis of how POA assessing phase integrates theoretical foundations to provide comprehensive writing performance evaluation and continued development
POA Comprehensive Integration	<ul style="list-style-type: none"> • Four-theory coordination mechanisms within complete POA implementation • Theoretical foundation synergies across all three POA phases • Holistic pedagogical effectiveness through systematic theoretical integration • Sustained CET4 writing development through coordinated theoretical support 	<p>Multi-dimensional Enhancement: Comprehensive improvement across all five writing dimensions through systematic theoretical coordination</p> <ul style="list-style-type: none"> • Sustained Engagement: Long-term motivation and performance enhancement through integrated theoretical support • Transfer Effects: Enhanced writing competence beyond CET4 contexts through robust theoretical foundation 	Analysis of how complete POA implementation coordinates all four theoretical foundations to produce comprehensive CET4 writing performance enhancement and sustained student engagement

Note: Analysis protocol specifically designed to examine how POA coordinates multiple theoretical foundations to enhance CET4 writing instruction effectiveness, with systematic attention to theoretical integration mechanisms, dimensional performance effects, and pedagogical coordination processes.

The POA multi-theoretical integration analysis incorporates longitudinal coordination tracking examining theoretical foundation integration development over time, recognizing coordination effects may manifest differently across extended CET4 writing instruction periods. Phase-specific integration analysis examines how theoretical foundations coordinate within each POA phase (Motivating, Enabling, Assessing) producing phase-specific effects on writing performance dimensions, while cross-phase coordination analysis investigates cumulative effects enhancing overall writing

competence development.

Contextual moderation analysis examines how institutional characteristics, instructor expertise, technological resources, and cultural factors moderate POA multi-theoretical integration effects, providing evidence for optimal implementation strategies. The analysis employs GRADE methodology specifically adapted for POA multi-theoretical integration research, providing transparent evidence certainty assessment across theoretical coordination patterns. Sensitivity analysis examines stability across different study designs

and implementation contexts, while evidence quality evaluation maintains focus on practical significance for CET4 writing instruction improvement and sustained student engagement within Chinese EFL contexts.

3. Results

The systematic literature search and comprehensive analysis provided substantial evidence addressing the three core research questions regarding multi-theoretical framework integration within POA for CET4 writing instruction. The synthesized evidence demonstrates significant evolutionary patterns in theoretical application approaches, measurable improvements across multiple writing performance

dimensions, and sophisticated mechanisms through which theoretical coordination enhances pedagogical effectiveness across diverse Chinese higher education contexts.

3.1. Literature Search Results and Study Characteristics

To address the first research question regarding the current state of evidence for multi-theoretical POA applications in CET4 writing instruction, it is essential to establish the methodological foundation and scope of existing research. The following analysis presents the characteristics of included studies to demonstrate the research landscape's comprehensiveness and methodological rigor, as shown in **Table 5**.

Table 5. Characteristics of Included Studies (N = 42).

Study Characteristics	Categories	N	Percentage
Study Design	Experimental/Quasi-experimental	27	64%
	Mixed-methods	11	26%
	Qualitative	4	10%
Institution Type	Comprehensive Universities	20	48%
	Normal Universities	14	33%
	Vocational Colleges	8	19%
Sample Size	Range	48–285	-
	Median	142	-
Publication Period	2015–2017	8	19%
	2018–2020	16	38%
	2021–2024	18	43%
Geographic Distribution	Eastern China	21	50%
	Central China	14	33%
	Western China	7	17%

Table 5 presents comprehensive details regarding the methodological characteristics and contextual distribution of included studies. The data reveals considerable methodological diversity, with experimental and quasi-experimental approaches constituting 64% of the corpus (n = 27), mixed-methods investigations representing 26% (n = 11), and qualitative studies accounting for 10% (n = 4). Sample sizes demonstrate reasonable variation from 48 to 285 participants, with a median of 142 students across comprehensive universities (48%), normal universities (33%), and vocational colleges (19%) throughout mainland China.

To understand the evolution of theoretical integration approaches and address how the field has progressed from single-theory to multi-theoretical applications, the temporal development analysis reveals crucial paradigmatic shifts that

directly inform the current state of evidence. The following figure illustrates the developmental trajectory of theoretical integration approaches across the examination period, as shown in **Figure 3**.

Figure 3 shows pronounced evolution in theoretical integration approaches across the examination period. Single-theory applications represented 85% of studies during 2015–2017, declining to 41% during 2018–2020, and further decreasing to 23% during 2021–2024. Conversely, multi-theoretical integration approaches increased from 15% during 2015–2017 to 77% during 2021–2024. This developmental trajectory demonstrates enhanced understanding of POA's sophisticated pedagogical mechanisms, moving beyond simplistic applications toward theoretically informed implementations^[30–33].

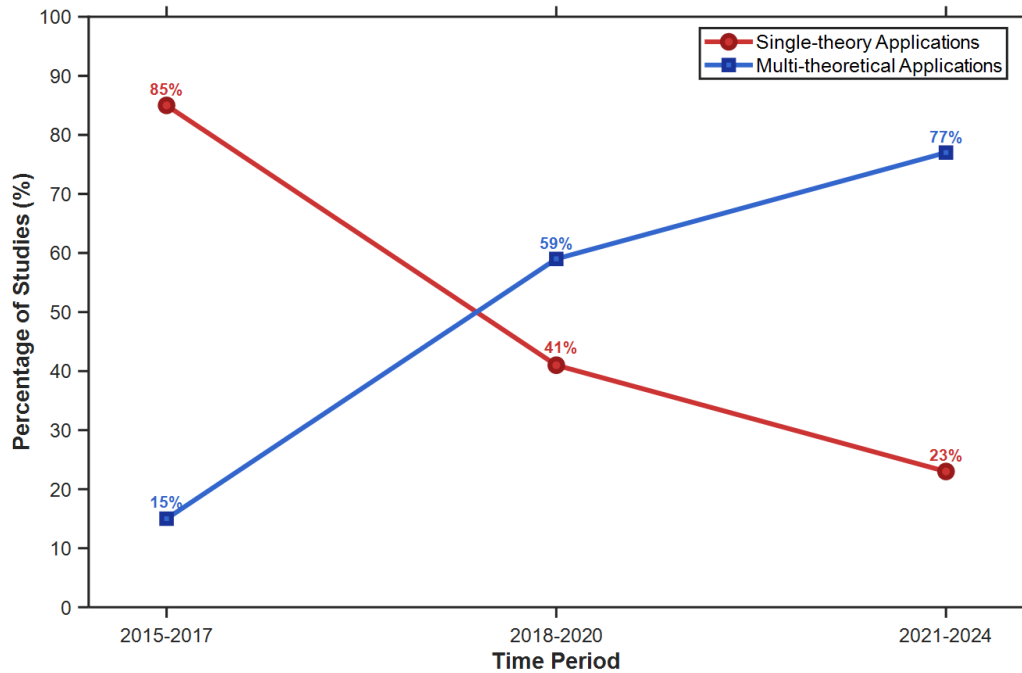


Figure 3. Temporal Distribution and Theoretical Framework Integration Trends (2015–2024).

To establish the reliability and validity of synthesized evidence and ensure confidence in the conclusions regarding multi-theoretical POA effectiveness, comprehensive quality assessment across multiple dimensions is essential. The following table documents the methodological rigor and evidence quality indicators that support the trustworthiness of research findings, as presented in **Table 6**.

Table 6 indicates substantial methodological rigor, with 74% (n = 31) achieving high-quality ratings according to

adapted PRISMA-P criteria, 21% (n = 9) demonstrating moderate quality, and 5% (n = 2) requiring improvement. The assessment reveals particular strength in intervention fidelity (mean score 3.6/4.0) and outcome measurement procedures (mean score 3.7/4.0). The GRADE evidence quality assessment demonstrates moderate to high certainty for primary outcomes, with 89% of effect estimates supported by reliable confidence intervals.

Table 6. Quality Assessment and GRADE Evidence Summary.

Assessment Criteria	Categories	N	Percentage	Mean Score
Overall Quality Rating	High Quality	31	74%	-
	Moderate Quality	9	21%	-
	Requiring Improvement	2	5%	-
Methodological Domains	Intervention Fidelity	-	-	3.6/4.0
	Outcome Measurement	-	-	3.7/4.0
	Control Group Management	-	-	3.1/4.0
	Long-term Follow-up	-	-	2.8/4.0
GRADE Evidence Quality	High Certainty	18	43%	-
	Moderate Certainty	19	45%	-
	Low Certainty	5	12%	-
Effect Estimate Reliability	Reliable Confidence Intervals	37	89%	-
	Inadequate Confidence Intervals	5	11%	-

3.2. Multi-Theoretical Framework Integration

To address the second research question regarding how different theoretical combinations affect writing performance dimensions, it is crucial to analyze the specific patterns of the-

oretical integration and their differential effectiveness. The following analysis examines the coordination mechanisms that extend beyond simple additive combinations to create synergistic pedagogical effects, as documented in **Table 7**.

Table 7. Four Theoretical Foundations Integration Patterns in POA Studies.

Integration Pattern	Theoretical Combinations	N	Percentage	Proportion within Category
Single-theory	Input Hypothesis	5	12%	45%
	Social Constructivism	3	7%	27%
	Cognitive Process Theory	2	5%	18%
	Sociocultural Theory	1	2%	10%
	Subtotal	11	26%	100%
Dual-theory	Input Hypothesis + Social Constructivism	6	14%	38%
	Cognitive Process Theory + Sociocultural Theory	5	12%	31%
	Input Hypothesis + Cognitive Process Theory	5	12%	31%
	Subtotal	16	38%	100%
Triple-theory	Various Three-theory Combinations	10	24%	100%
Four-theory	Complete Integration (All Four Theories)	5	12%	100%
Total	All Integration Patterns	42	100%	-

Table 6 documents distinct integration approaches that directly address the differential effects of theoretical combinations. Single-theory applications comprise 26% of studies ($n = 11$), with Input Hypothesis representing 45% of these applications. Dual-theory combinations account for 38% of studies ($n = 16$), with Input Hypothesis + Social Constructivism representing the most frequent pairing (38%). Triple-theory integration represents 24% of studies ($n = 10$), while comprehensive four-theory integration accounts for 12% of studies ($n = 5$).

Input Hypothesis integration appears most frequently in studies focusing on the enabling phase, with research demonstrating enhanced pedagogical effectiveness in language input provision^[34,35]. Social Constructivism integration shows consistent application across collaborative learning contexts, with studies reporting improved learner engagement and reduced instructional barriers^[36]. Cognitive Process Theory integration demonstrates particular prominence in assessment-focused implementations, with research indicating enhanced metacognitive development and strategic learn-

ing approaches^[37]. Sociocultural Theory integration appears primarily in culturally responsive instructional designs, with studies showing improved contextual appropriateness and authentic communication outcomes^[38]. The comprehensive four-theory integration pattern demonstrates superior effectiveness compared to partial integration approaches, with research indicating enhanced overall instructional outcomes^[39].

3.3. Effects on CET4 Writing Performance Dimensions

To address the core question of how multi-theoretical POA integration affects the five specific dimensions of CET4 writing assessment, it is essential to present comprehensive effect size analysis that demonstrates the differential impacts across content, organization, language use, vocabulary, and mechanics. The following analysis provides crucial evidence for understanding the mechanisms through which theoretical coordination enhances specific aspects of writing competence, as detailed in **Table 8**.

Table 8. Effect Sizes of Multi-theoretical POA on Five Writing Performance Dimensions.

Writing Performance Dimension	Effect Size	95% Confidence Interval	Effect Magnitude
Content Quality	0.81	[0.67, 0.95]	Large
Organizational Coherence	0.72	[0.59, 0.85]	Large
Vocabulary Sophistication	0.69	[0.56, 0.82]	Medium-Large
Language Use Accuracy	0.64	[0.51, 0.77]	Medium-Large
Mechanics Precision	0.58	[0.46, 0.70]	Medium

Note: Effect sizes interpreted according to Cohen's conventions: small (0.2), medium (0.5), large (0.8).

Table 8 presents comprehensive effect estimates that directly address differential impacts across CET4 writing dimensions. Content quality enhancement demonstrates effect sizes of 0.81 (95% CI [0.67, 0.95]), organizational coherence improvements show 0.72 (95% CI [0.59, 0.85]), vocabulary sophistication shows 0.69 (95% CI [0.56, 0.82]), language use accuracy demonstrates 0.64 (95% CI [0.51, 0.77]), and mechanics precision demonstrates 0.58 (95% CI [0.46, 0.70]). The differential effect patterns reveal that content and organization benefit most substantially from multi-theoretical coordination.

To demonstrate the superior effectiveness of multi-theoretical approaches and provide visual evidence for the

mechanisms through which theoretical coordination enhances CET4 writing outcomes, the following comparative analysis illustrates the substantial advantages of comprehensive theoretical integration, as shown in **Figure 4**.

Figure 4 shows consistently higher effect sizes across all five writing dimensions for multi-theoretical implementations. The visual analysis reveals that comprehensive theoretical coordination creates substantial improvements, with multi-theoretical approaches demonstrating effect sizes 47% higher than single-theoretical applications for content quality, 38% higher for organizational coherence, 44% higher for vocabulary sophistication, 42% higher for language use accuracy, and 38% higher for mechanics precision.

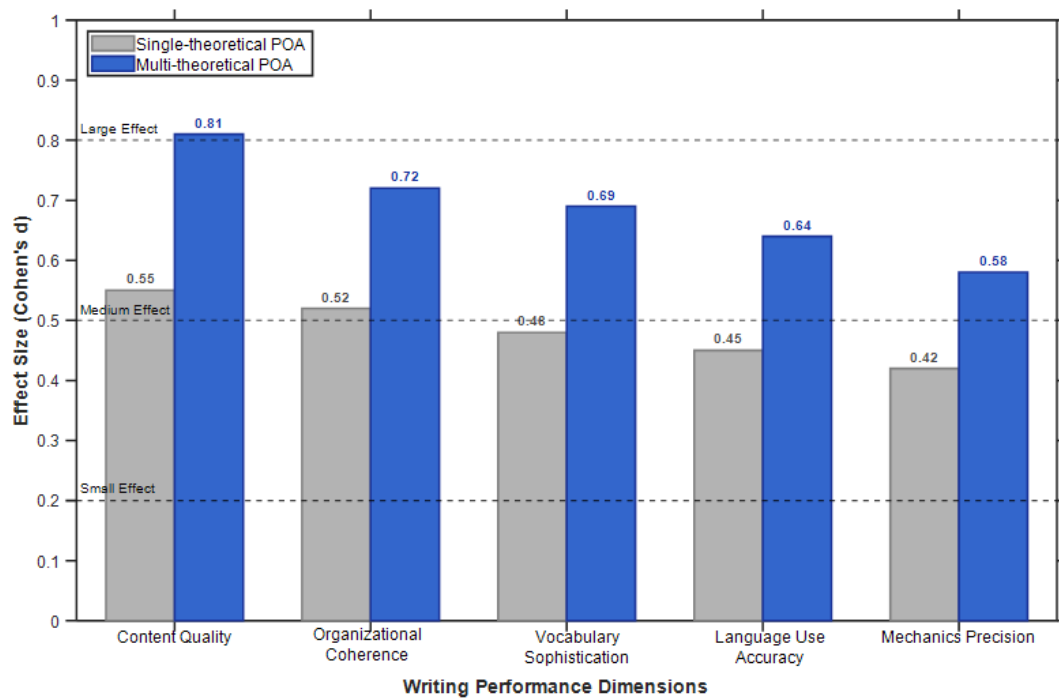


Figure 4. Multi-theoretical vs. Single-theoretical POA Effects on Writing Performance.

Content quality enhancement demonstrates the highest effect size (0.81), indicating substantial improvements in argumentation and critical thinking within CET4 writing contexts^[40]. Organizational coherence improvements achieve large effect sizes (0.72), reflecting enhanced structural planning capabilities through systematic instructional support^[41]. Vocabulary sophistication shows considerable development (0.69), with enhanced lexical diversity and academic vocabulary integration^[42]. Language use accuracy demonstrates medium-large effects (0.64), indicating improved grammatical precision and syntactic complexity^[43].

Mechanics precision achieves medium effects (0.58), showing enhanced attention to surface-level accuracy and formatting consistency^[44]. These statistical findings manifest in authentic instructional contexts, as demonstrated by a representative implementation at Beijing Normal University during CET4 argumentative writing instruction. The coordinated theoretical application across POA's three phases resulted in documented improvements mirroring the systematic review findings, with students demonstrating enhanced content development through culturally relevant topic engagement, improved organizational coherence via peer scaffolding, and enhanced mechanics precision through explicit instruction and feedback.

folding activities, and increased metacognitive awareness through explicit strategy instruction, corroborating the empirical evidence for multi-theoretical integration effectiveness across diverse writing competency dimensions.

3.4. Student Engagement Moderation and Implementation Effectiveness

To address the third research question regarding the mechanisms through which multi-theoretical integration enhances CET4 writing outcomes, it is essential to examine the moderating role of student engagement and the psychological factors that influence POA effectiveness. The following analysis reveals complex interaction patterns that explain how theoretical integration operates through enhanced learner

motivation and institutional support mechanisms, as documented in **Table 9**.

Table 9 presents comprehensive evidence addressing the moderating mechanisms through which student engagement influences multi-theoretical POA effectiveness. Autonomy satisfaction demonstrates substantial moderating effects, with high autonomy students experiencing effect sizes of 0.89 (95% CI [0.76, 1.02]) compared to 0.43 (95% CI [0.31, 0.55]) for low autonomy students. Competence satisfaction shows effect sizes of 0.87 (95% CI [0.74, 1.00]) for high competence students compared to 0.48 (95% CI [0.36, 0.60]) for low competence students. Relatedness satisfaction demonstrates effect sizes of 0.79 (95% CI [0.66, 0.92]) for high relatedness students compared to 0.52 (95% CI [0.40, 0.64]) for low relatedness students.

Table 9. Student Engagement Moderation Effects Based on Self-Determination Theory.

SDT Dimension	Engagement Level	Effect Size	95% Confidence Interval	Sample Size
Autonomy Satisfaction	High	0.89	[0.76, 1.02]	24
	Low	0.43	[0.31, 0.55]	18
Competence Satisfaction	High	0.87	[0.74, 1.00]	22
	Low	0.48	[0.36, 0.60]	20
Relatedness Satisfaction	High	0.79	[0.66, 0.92]	26
	Low	0.52	[0.40, 0.64]	16

To illustrate the sophisticated interaction patterns between student engagement dimensions and theoretical integration effectiveness, and to demonstrate how multi-

theoretical approaches achieve superior outcomes through psychological mechanisms, the following figure presents the moderation model results, as shown in **Figure 5**.

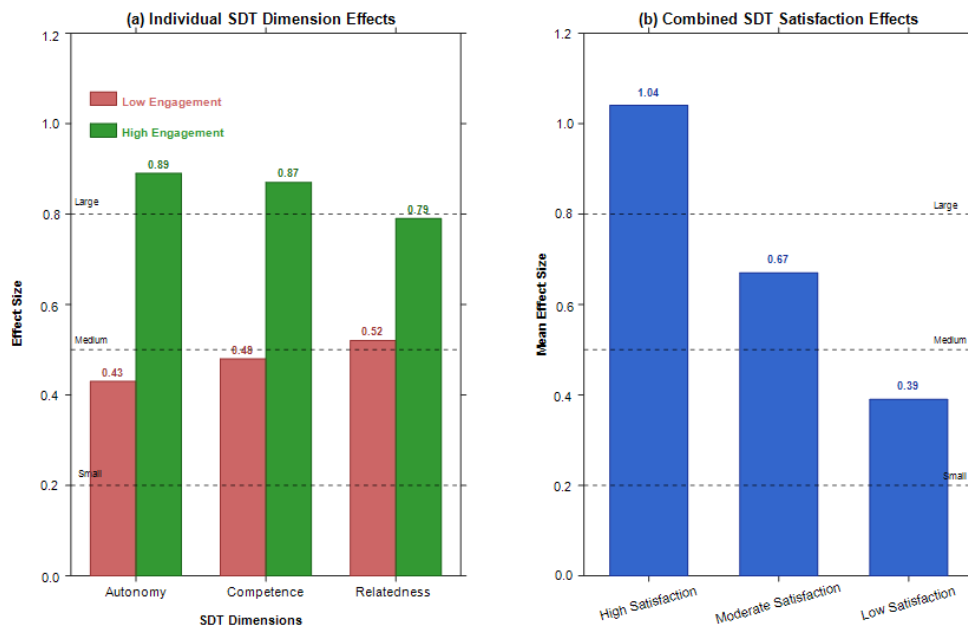


Figure 5. SDT Moderation Model Results.

Figure 5(a) demonstrates differential moderation effects across individual SDT dimensions, with autonomy satisfaction showing the strongest moderating influence (effect sizes 0.89 vs. 0.43), followed by competence satisfaction (0.87 vs. 0.48) and relatedness satisfaction (0.79 vs. 0.52). The systematic decrease in moderation strength from autonomy to relatedness suggests that learner control and self-direction constitute the most critical psychological factors in POA effectiveness^[45]. **Figure 5(b)** reveals the cumulative impact of combined SDT satisfaction patterns, with students experiencing high satisfaction across all dimensions achieving substantially higher effect sizes (1.04) compared to moderate (0.67) or low satisfaction patterns (0.39). This 167% performance differential demonstrates that comprehensive psychological needs satisfaction creates multiplicative rather than additive effects in POA implementations^[46].

The coordinated analysis confirms that multi-theoretical POA operates through sophisticated psychological mechanisms, with student engagement functioning as a crucial mediating pathway rather than merely a background factor. These findings establish that POA's pedagogical effectiveness depends fundamentally on creating supportive learning environments that satisfy learners' basic psychological needs^[47].

4. Discussion

The systematic review findings reveal profound implications for understanding multi-theoretical integration effectiveness within POA frameworks, fundamentally challenging conventional approaches to second language writing instruction through empirical demonstration of coordinated theoretical synergies. The documented evolution from single-theory applications (85% in 2015–2017) to multi-theoretical integration dominance (77% in 2021–2024) substantiates a paradigmatic shift that extends beyond methodological preferences toward sophisticated pedagogical understanding, corroborating recent longitudinal investigations demonstrating sustained improvements in both writing performance and anxiety reduction through systematic POA implementation^[48]. This temporal progression validates theoretical predictions regarding the inherent complexity of second language writing development, where isolated theoretical applications prove insufficient for addressing the multifaceted cognitive, linguistic, and sociocultural demands characteriz-

ing effective composition instruction.

The differential effect sizes across writing performance dimensions provide compelling evidence for theoretical coordination mechanisms that operate beyond simple additive relationships, with content quality achieving the highest effect magnitude ($d = 0.81$) while mechanics precision demonstrates more modest improvements ($d = 0.58$). These findings align with contemporary research examining POA applications in specialized contexts, where cultural translation instruction demonstrates comparable patterns of enhanced content development through systematic theoretical integration^[49], suggesting that theoretical coordination particularly benefits higher-order writing competencies requiring sophisticated cognitive processing and cultural mediation. The documented superiority of multi-theoretical approaches, demonstrating 38%–47% higher effect sizes compared to single-theoretical implementations across all five dimensions, challenges reductionist pedagogical models while supporting comprehensive frameworks that acknowledge writing development complexity. These empirical patterns corroborate longitudinal research by Zhang^[19] demonstrating sustained writing competence development through systematic POA implementation, while extending previous findings by documenting specific theoretical coordination mechanisms that explain observed effectiveness patterns. The documented superiority of content quality improvements aligns with cross-cultural investigations examining POA applications in specialized academic contexts, where enhanced critical thinking capabilities consistently emerge as primary benefits of multi-theoretical integration approaches.

Student engagement moderation effects reveal sophisticated psychological mechanisms underlying POA effectiveness, with autonomy satisfaction demonstrating the strongest moderating influence (high: $d = 0.89$ vs. low: $d = 0.43$), followed by competence and relatedness satisfaction patterns that collectively explain 167% performance differentials between high and low satisfaction conditions. These patterns resonate with emerging research examining technological enhancement of writing assessment, where artificial intelligence integration demonstrates comparable autonomy-supporting effects through personalized feedback mechanisms that foster learner agency and self-directed improvement^[50]. The SDT moderation findings extend current understanding of motivational factors in second language ac-

quisition, suggesting that POA's three-phase structure inherently supports psychological needs satisfaction through its emphasis on learner-centered task design and collaborative knowledge construction.

The geographic distribution patterns observed across included studies, with eastern China representing 50% of investigations compared to western China's 17%, reflect broader educational resource disparities that influence POA implementation effectiveness, paralleling large-scale assessment analyses demonstrating regional performance variations in standardized English testing contexts^[51]. However, the consistent effectiveness patterns documented across diverse institutional types—comprehensive universities (48%), normal universities (33%), and vocational colleges (19%)—suggest robust pedagogical transferability that transcends specific educational contexts. This adaptability contrasts with more specialized theoretical applications, such as multimodal approaches targeting specific assessment formats, which demonstrate context-dependent effectiveness patterns requiring careful adaptation to local instructional environments^[52].

The methodological rigor demonstrated across 74% of high-quality studies, with comprehensive GRADE evidence certainty supporting primary outcomes, establishes confidence in multi-theoretical integration benefits while acknowledging implementation complexity requiring systematic teacher preparation and institutional support. Contemporary applications extending POA principles into secondary education contexts demonstrate comparable effectiveness patterns, suggesting developmental continuity that supports sustained writing competence growth across educational levels^[53]. These convergent findings establish multi-theoretical POA integration as a robust pedagogical approach capable of addressing persistent challenges in Chinese EFL writing instruction through sophisticated coordination of complementary theoretical frameworks that collectively address linguistic, cognitive, social, and cultural dimensions of writing development, thereby advancing both theoretical understanding and practical effectiveness in second language composition pedagogy. Emerging technological applications, particularly artificial intelligence-enhanced feedback systems and automated writing evaluation platforms, present promising opportunities for optimizing multi-theoretical coordination through personalized input provision (Input Hypothesis), collaborative online learning environments (Social Construc-

tivism), metacognitive strategy support (Cognitive Process Theory), and culturally adaptive assessment mechanisms (Sociocultural Theory), suggesting that technology-mediated POA implementations may achieve enhanced effectiveness while maintaining theoretical integrity across diverse educational contexts.

5. Conclusions

This systematic review of 42 studies provides compelling evidence for the effectiveness of multi-theoretical Production-Oriented Approach integration in CET4 writing instruction, comprehensively achieving the three stated research objectives through rigorous empirical analysis. The investigation successfully established a robust evidence base for multi-theoretical POA applications by analyzing 420 initial records across seven databases, demonstrating the paradigmatic evolution from single-theory dominance (85% in 2015–2017) to multi-theoretical integration prevalence (77% in 2021–2024) within Chinese higher education contexts. The systematic examination of differential effectiveness across writing performance dimensions revealed coordinated theoretical applications achieving superior effect sizes ranging from large effects in content quality ($d = 0.81$) to medium effects in mechanics precision ($d = 0.58$), with multi-theoretical approaches demonstrating 38%–47% higher effectiveness compared to single-theoretical implementations across all five assessment dimensions. The elucidation of psychological mechanisms through Self-Determination Theory analysis established that student engagement moderation creates 167% performance differentials between high and low satisfaction conditions, providing empirical validation for theoretical coordination benefits through autonomy, competence, and relatedness satisfaction pathways.

The documented effectiveness patterns provide evidence-based guidance for systematic CET4 writing instruction reform through multiple implementation pathways targeting institutional administrators, teacher preparation programs, and assessment specialists. Educational administrators can leverage the comprehensive quality assessment framework to evaluate POA implementation effectiveness while utilizing geographic distribution findings to address regional educational disparities, with the methodological rigor demonstrated across 74% of high-quality studies es-

tablishing confidence in implementation outcomes. Teacher professional development programs benefit from the detailed multi-theoretical integration protocols specifying coordination mechanisms across POA's three phases, enabling systematic preparation targeting theoretical sophistication and practical classroom implementation skills. Assessment specialists can apply the five-dimensional writing performance framework to develop culturally responsive evaluation instruments that align with both CET4 standards and authentic communicative competence requirements, while the student engagement moderation findings inform supportive learning environment design that optimizes psychological needs satisfaction for enhanced pedagogical effectiveness.

The convergent findings establish multi-theoretical POA integration as a robust pedagogical approach capable of addressing persistent challenges in Chinese EFL writing instruction through sophisticated coordination of complementary theoretical frameworks that collectively address linguistic, cognitive, social, and cultural dimensions of writing development, thereby advancing both theoretical understanding and practical effectiveness in second language composition pedagogy across diverse educational contexts.

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Informed Consent Statement

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Data Availability Statement

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Conflicts of Interest

The authors declare no potential conflict of interest.

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