

The Effect of Morphological Awareness Training on SLA among College Students: An Empirical Study Based on Eye-Tracking and Interviews

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Abstract: In second language acquisition, morphological awareness plays a key role in enhancing English learning efficiency. This study combined eye-tracking technology and qualitative interviews with 160 non-English majors in a college of Shenzhen, China. Results show systematic morpheme teaching significantly improves vocabulary mastery, reading comprehension and learning motivation, with stable long-term effects. The study proposes a “explicit teaching-contextualized learning-lexical network construction” strategy, confirming morphemic awareness as a cognitive optimization tool. This research not only contributes to the theoretical framework of SLA in the digital era but also provides empirical evidence and actionable pedagogical models for reforming English teaching in higher education.

1. Introduction

Morphological awareness—the ability to manipulate morphemes and word formation rules—directly determines vocabulary acquisition efficiency and reading comprehension depth[1]. However, current Chinese college English teaching often neglects systematic morphological training[2]. According to the *2022 Vocational English Teaching Survey Report* issued by China’s Ministry of Education, approximately 67.3% of vocational students primarily rely on rote memorization for vocabulary learning, while only 12.5% of teachers systematically instruct word formation rules[3]. This pedagogical approach results in inefficient learning, limited short- and medium-term performance improvements, and gradual erosion of students’ motivation for autonomous vocabulary acquisition. This 15-week controlled experiment with 160 non-English majors combined eye-tracking and qualitative analysis to examine morphological awareness training effects. The research proposed an innovative “trinity” training strategy, contributing to SLA theory and providing empirical evidence for vocational English teaching reform.

2. Theoretical Framework

2.1 Conceptualizing Morphological Awareness

The term “morpheme”, first introduced by American structural linguist Leonard Bloomfield in his seminal work *Language*, is defined as “the smallest meaningful unit in word formation”[4]. Bauer expanded this conceptualization by introducing “allomorph” and “zero morpheme” constructs[5]. Kuo and Anderson subsequently proposed that in SLA contexts, morphological awareness manifests through three hierarchical competencies: (1) decomposition ability (e.g., parsing “unhappiness” into “un-happ(y)-ness”), (2) combination ability (e.g., deriving new words using “-able”), and (3) inference ability (e.g., deducing meanings of derived words through affix analysis)[6]. These competencies directly influence language learning efficiency and determine vocabulary knowledge depth.

2.2 Literature Review

Amidst rapid digital transformation in language education, SLA research is undergoing a paradigm shift from “general teaching methods” to “cognitive precision interventions”. International scholarship on morphological awareness has achieved relative maturity, with Zhang & Koda employing path analysis to quantify its direct/indirect effects on reading[7], while Goodwin et al. demonstrated through longitudinal studies that systematic morphological instruction can increase students’ vocabulary by an average of 31.5%[8]. In contrast, research in China remains in exploratory stages. Li Hong conducted empirical studies suggesting Chinese morphological awareness positively transfers to English learning[9]. However, existing research exhibits two limitations: (1) predominant focus on basic education while neglecting vocational students—a group with weak motivation but urgent professional needs; (2) insufficient longitudinal tracking of instructional interventions to verify whether morphological knowledge transforms into sustainable cognitive strategies[10].

3. Methodology

3.1 Participants

Using stratified sampling based on gender and major, 160 first-year non-English majors (see Table 1) from a vocational university in Shenzhen were selected and randomly assigned to either an experimental group (n=80) or control group (n=80).

Table 1 Participant demographics (N=160)

Variable	Category	Number	Percentage
Gender	Male	88	55%
	Female	72	45%
Major	Engineering	56	35%
	Business	56	35%
	Humanities	48	30%

3.2 Research Instruments

(1) Morphological Awareness Test(MAT): Comprising (a) affix recognition, (b) derivational word generation, and (c) morpheme segmentation.

(2) Eye-tracking for Reading Speed: During training, four CET-4 reading passages were randomly selected, each with five comprehension questions, with reading speed and accuracy measured using eye-tracking technology.

(3) Post-training CET-4 Mock Test: Administered one month post-intervention to assess learning efficiency improvements.

3.3 Research Design

Experimental group received 15-week morphological awareness training (see Table 2) with three modules:

Table 2 Morphological awareness training design

Module	Schedule	Content	Example Activities
Explicit Teaching	1 session /week	Instruction of word-formation rules	1) Explaining derivational morphology 2) Affix-card games 3) Error analysis exercises
Contextualized Learning	1 session /week	Applying vocabulary in authentic contexts	1) Contextual meaning inference 2) Affix-detective activities 3) Role-plays using target affixes
Lexical Network Construction	Online activities	Building lexical systems with AI tools	1) Word clouds 2) Personalized vocabulary exercises via learning platforms

4. Results and Discussion

4.1 Quantitative Findings

Data analyzed using SPSS 26.0 revealed that the experimental group's MAT post-test score was 78.62 (SD=2.38), significantly higher than control group's 63.6 (SD=5.26; $p<0.05$). While the delayed post-test of CET-4 showed the experimental group's average score was 86.23, while the control group scored 65.8. This represents a 41.31% improvement for the experimental group, with reduced score dispersion (SD decreased from 4.86 to 3.62), demonstrating that the training significantly enhanced English learning ability across individuals. In contrast, the control group showed only a 7.83% improvement with increased score dispersion (SD rose from 4.86 to 5.38), suggesting traditional methods had limited effectiveness and may exacerbate individual differences. (See Table 3)

Table 3 CET-4 mock test results

Group	Pre-test		Delayed Post-test of CET4	
	Mean	SD	Mean	SD
Experimental	61.02	4.86	86.23↑↑	3.62↓
Control	61.02	4.86	65.8↑	5.38↑

4.2 Eye-Tracking Data

Eye-tracking metrics demonstrated:

(1) Reduced fixation duration: Experimental group's fixation time on derived words (e.g., "unforgettable") was 32% lower (285ms±28ms vs. 420ms±35ms).

(2) Fewer regressions: Control group exhibited more regressions when parsing complex words (experimental: 1.2 ± 0.3 regressions/word; control: 2.8 ± 0.5).

(3) Enhanced reading speed: Experimental group's average reading time decreased from 360 ± 20 s to 300 ± 15 s, versus control group's reduction from 360 ± 18 s to 342 ± 17 s.

4.3 Qualitative Findings

Interviews showed:

(1) Vocabulary processing differences: 96% of experimental group employed “analyze-deconstruct-associate-contextualize” for derived words, versus <20% in control group relying on deconstruction.

(2) Motivational differences: 98% of experimental group reported enhanced confidence and learning willingness, while 75% of control group expressed learning difficulties and inefficiency.

5. Conclusions

Morphological awareness significantly enhances English learning efficiency by shifting cognitive strategies from rote memorization to structural analysis, improving vocabulary, reading, and language production. It boosts autonomous learning motivation through self-efficacy, with universal benefits that reduce individual differences. The study validates its role as a cognitive optimization tool in SLA and proposes a digital-integrated “trinity” instructional framework, addressing vocational education's need for effective English teaching reform.

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