European Journal of Education Science

Vol. 1 No.1 2025

Article **Open Access**

The Impact of Field Cognitive Styles on Performance Outcomes in Peer Review of Translation

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Received: 14 April 2025
Revised: 20 April 2025
Accepted: 11 May 2025
Published: 16 May 2025

Abstract: This study investigates how learners with different field cognitive styles perform in peer review of translation. Conducted over a 15-week empirical period with 50 sophomore students majoring in non-English disciplines, the research reveals several key findings. Despite differences in cognitive styles, learners generally demonstrated a high degree of acceptance toward peer feedback. No significant correlation was found between cognitive style and translation proficiency before the peer review activities; however, a significant relationship emerged afterward. Peer review proved beneficial for all learners, regardless of cognitive style, with field-dependent learners exhibiting particularly notable improvement. These findings offer pedagogical insights into the integration of cognitive style awareness into translation instruction, enhancing learning outcomes from both instructional and student-centered perspectives.

Keywords: peer review; field-dependent/independent cognitive styles; learning performance

1. Introduction

Peer review, as a process-oriented instructional method rooted in collaborative learning theory, has received growing scholarly interest due to its emphasis on process, collaboration, reflection, and learner autonomy. While most research in this domain has centered on second language (L2) writing, comparatively little attention has been paid to translation pedagogy [1].

Existing studies on peer review generally fall into three categories: learners' attitudes toward peer review; the extent to which peer review facilitates learning; and the impact of variables such as feedback format, technological medium, and individual learner characteristics on review effectiveness. Among these individual factors, prior research has predominantly examined the influence of L2 proficiency discrepancies. Some findings suggest that mismatched reviewer-author proficiency levels may enhance feedback effectiveness and lead to more substantial revision outcomes [2]. Moreover, peer review appears to benefit the reviewers themselves, although the extent of this benefit often depends on the partner's ability and feedback quality.

However, L2 proficiency is not the sole factor influencing performance in peer review. Cognitive style — defined as a habitual mode of information processing — also plays a significant role. Field dependence/independence, in particular, has long been recognized as a major variable influencing learning behavior. Despite this, its role in translation peer review remains underexplored. Accordingly, this study aims to examine how learners with different field cognitive styles engage in peer review within a translation context,

thereby shedding light on the dynamic interplay between cognitive traits and collaborative learning.

In addition, emerging technologies — particularly artificial intelligence — have demonstrated great potential in enhancing language instruction. For instance, AI-based tools have been shown to empower learners through adaptive feedback and personalized language modeling, which may support diverse cognitive styles and learning preferences. One study highlights how AI-driven platforms effectively support non-native children in mastering Chinese, providing new avenues for individualized learning [3].

2. Research Status

The distinctiveness of individual cognitive styles is often reflected across four dimensions: context, input, processing, and response. Within this framework, the concept of field-dependent and field-independent cognitive styles has emerged as a foundational area of inquiry [4]. The term "field" refers to the situational context in which learning takes place, encompassing both physical and social environments.

Field dependence/independence has long been recognized as one of the most thoroughly investigated dimensions of cognitive style. Learners situated at the field-independent end of the spectrum typically rely on internal frames of reference, engage in analytical processing, and exhibit a high degree of autonomy in learning. They are often skilled at problem decomposition and focusing on central issues. In contrast, field-dependent learners tend to rely on external references, prefer holistic processing, and are more attuned to environmental cues. They thrive in collaborative environments and show a preference for interpersonal interaction during the learning process.

In the field of second language acquisition, considerable attention has been given to the correlation between cognitive styles and L2 learning outcomes. While some studies suggest limited or inconsistent relationships between field independence and certain aspects of language competence, others indicate that field dependence may be more relevant in contexts requiring social interaction and environmental responsiveness [5]. Findings have also shown that science students often exhibit stronger field-independent tendencies, whereas learners in humanities disciplines may demonstrate more field-dependent characteristics. Additionally, field-dependent learners have shown greater variability in performance, suggesting a higher sensitivity to instructional conditions.

When it comes to translation studies, research examining the impact of cognitive style remains relatively underdeveloped. Some investigations suggest that advanced learners may exhibit more field-dependent traits than beginners, and that field-independent learners may outperform their peers in tasks involving analytical language processing, such as translation between Chinese and English [6]. However, these insights are based on a limited number of small-scale studies, and more empirical evidence is needed to clarify the relationship between cognitive style and translation performance.

Moreover, emerging technologies such as artificial intelligence are introducing new variables into this discussion. AI-assisted platforms have shown promise in enhancing Chinese language acquisition for non-native learners by aligning instructional strategies with learners' cognitive preferences. Research on AI-powered language learning has demonstrated how adaptive technologies can support diverse cognitive styles, particularly in translation and language instruction [7]. Additionally, AI-driven systems have been successfully applied in adult education, promoting personalized learning and increasing accessibility for learners with varied cognitive backgrounds [8].

In summary, while the role of field-dependent and field-independent cognitive styles has been extensively studied in second language acquisition, their impact in translation studies — particularly within peer review contexts — remains largely unexplored. Further research is warranted to understand how cognitive styles influence learning outcomes when collaborative review is incorporated into translation instruction.

3. Research Design

This study employed a 15-week peer review-based experimental design to investigate how learners with differing field cognitive styles perform in translation tasks, with a focus on individual differences in learning outcomes.

1) Research Questions
   a) To what extent do learners with different field cognitive styles accept peer review feedback?
   b) Is there a correlation between field cognitive styles and translation competence?
   c) How does peer review facilitate learning for learners with different field cognitive styles?
2) Research Participants

The participants were 50 second-year non-English major students (8% male, 92% female) from a provincial university in northeastern China. Selection criteria included:

   a) completion of standardized CET-4 translation instruction.
   b) demonstrable capacity for self-directed English learning.
   c) no prior exposure to peer review practices.

This ensured a relatively homogeneous baseline in translation experience while allowing cognitive style to emerge as a key differentiating variable.

3) Research Instruments

To accurately classify learners' cognitive styles, a modified version of the Embedded Figures Test was used. Participants were required to locate simple geometric shapes hidden within complex visual patterns under timed conditions. Scores were calculated using standardized methods, yielding classifications along the field-dependent and field-independent continuum [9].

To assess translation proficiency, two sets of parallel Chinese-to-English translation tasks were designed to match CET-4 content in length, genre, and difficulty. The topics included national image, transportation, and tourism. Trained evaluators applied holistic scoring criteria aligned with CET-4 standards to assess both pre-test and post-test translations.

4) Research Procedure

The research followed a four-phase sequence over 15 weeks:

   a) Weeks 1–3: The initial phase involved baseline data collection. Week 1 included a pretest to assess participants' initial translation competence and explore any pre-existing correlation with cognitive style. In Week 2, a comprehensive English proficiency test was administered to control for general language ability across listening, reading, writing, and translation. Week 3 was dedicated to identifying participants' cognitive styles through the Embedded Figures Test. Results indicated that 68% were field-independent (34 students) and 32% were field-dependent (16 students).
   b) Week 4: A peer review training session was implemented. It included theoretical instruction on evaluation principles, demonstrations of model reviews, and hands-on practice. This ensured participants were adequately prepared for peer assessment.
   c) Weeks 5–13: Peer review activities were conducted on a triweekly basis. In each session, participants completed a 150-word Chinese-to-English translation within 30 minutes. Drafts were submitted electronically and randomly distributed to three anonymous peers for review. After receiving feedback, students revised and resubmitted their work. This cycle was repeated three times to reinforce iterative learning.
   d) Week 14: A post-test was administered to measure translation gains. Two experienced instructors independently graded all English proficiency and

translation tests using CET-4 scoring rubrics. Inter-rater reliability was verified through SPSS analysis (Cronbach's $\alpha > 0.85$), confirming consistency in evaluation.

This comprehensive design ensured methodological rigor through randomized, blinded peer review; multiple evaluation cycles; and validated scoring instruments. The process was also informed by recent advances in AI-assisted education. Research on AI-enhanced online Chinese language instruction demonstrates how digital platforms can facilitate individualized learning, increase student engagement, and provide scalable solutions for feedback and evaluation — principles that align well with the structured, reflective nature of peer review activities [10].

5) Results and Discussion

a) Acceptance of Peer Review Feedback Among Learners with Different Field Cognitive Styles

To evaluate learners' acceptance of peer review feedback, this study quantified both the volume of feedback received and the rate of adoption across three assessment cycles. Field-independent learners collectively received 2,507 feedback items, of which 2,086 (83.2%) were either directly incorporated or indirectly reflected in their revised translations [11]. Field-dependent learners received a total of 1,186 feedback items, with 972 (82.0%) being adopted in a similar manner.

The data indicate a high level of feedback acceptance (>80%) across both cognitive groups, with only marginal differences between them (83.2% vs. 82.0%) that were not statistically significant [12]. This finding runs counter to initial expectations. According to established theoretical assumptions, field-dependent learners — being more reliant on external cues — would presumably be more receptive to peer input, whereas field-independent learners, who process information based on internal frameworks, might display lower acceptance. However, this study's results suggest otherwise.

Post-hoc interviews provided further insight into this apparent contradiction. Field-independent learners were found to engage in careful analytical evaluation of peer comments, verifying the reliability of suggestions from multiple perspectives before selectively incorporating them [13,14]. Their relatively high acceptance rate thus reflects a rigorous filtering process that ultimately validated the quality of peer feedback. In contrast, field-dependent learners displayed a more heuristic approach — readily accepting peer suggestions due to their susceptibility to external input. Despite their differing processing strategies, both groups arrived at similar quantitative adoption rates, indicating that divergent cognitive mechanisms may nonetheless lead to comparable outcomes in peer feedback utilization.

To explore whether learners' cognitive styles influenced their response to specific types of feedback, the study classified peer comments into four categories based on an established taxonomy of translation error types: (1) technical (e.g., formatting, consistency in terminology), (2) pragmatic (e.g., register, cultural appropriateness), (3) semantic (e.g., accuracy of meaning and conceptual clarity), and (4) grammatical (e.g., syntax, morphology). Adoption rates for each category were then calculated to identify potential cognitive-style-specific patterns in feedback response.

Statistical analysis showed no significant difference between field-dependent and field-independent learners in their acceptance of technical, pragmatic, or grammatical feedback [15]. However, a notable disparity emerged in the semantic category. Field-independent learners demonstrated a significantly higher acceptance rate for semantic feedback (84.6%) compared to field-dependent learners (79.5%).

Semantic issues, in this context, primarily involved inaccurate interpretation or expression of the original text, as well as omissions and mistranslations. These problems often arose from structural differences between Chinese and English [16]. When receiving peer suggestions addressing these semantic concerns, field-dependent learners appeared

more likely to rigidly adhere to the structure of the source text, exhibiting less critical engagement with alternative interpretations. This cognitive tendency contributed to their relatively lower acceptance of semantically focused feedback.

b) Correlation Between Field Cognitive Styles and Translation Competence

To explore whether field cognitive styles are associated with translation competence, this study conducted bivariate correlation analyses, using cognitive style as the independent variable and translation pre-test and post-test scores as dependent variables. To control for the possible confounding effect of general English proficiency, comprehensive English test scores were included as a covariate in subsequent multiple regression analyses.

Table 1 presents the results for the pre-test. Neither field cognitive style nor general English proficiency significantly predicted translation scores before the peer review activities (Sig. = 0.176, 0.239 > 0.05). This suggests that learners' initial translation performance was not significantly influenced by either factor, which aligns with previous findings that early-stage learners often rely more on language intuition than formal training.

Table 1. The Results of Multiple Regression Analysis of the Pre-Test.

	Unstandardized coefficient		**Standardized coefficient**			**Collinear Statistics**	
Model	B	Standard Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	39.655	26.372		1.504	0.139		
Field Cognitive Style	0.353	0.256	0.196	1.375	0.176	0.984	1.017
English Proficiency	0.299	0.251	0.172	1.192	0.239	0.957	1.045

After the three peer review cycles, however, the regression results showed a statistically significant relationship between field cognitive style and post-test performance (Sig. = 0.005 < 0.05), as shown in Table 2. In contrast, English proficiency remained non-significant (Sig. = 0.090 > 0.05), indicating that the observed gains in translation competence were more closely linked to cognitive style than to general language ability.

Table 2. The Results of Multiple Regression Analysis of the Post-Test.

	Unstandardized coefficient		**Standardized coefficient**			**Collinear Statistics**	
Model	B	Standard Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	38.077	15.488		2.458	0.018		
Field Cognitive Style	0.442	0.151	0.368	2.934	0.005	0.984	1.017
English Proficiency	0.401	0.147	0.346	2.721	0.090	0.957	1.045

This finding suggests that as learners engaged in multiple rounds of peer review — reading peers' translations, providing and receiving feedback, and revising their work — they actively processed linguistic input in ways shaped by their cognitive styles. Over time, these behaviors appeared to reinforce patterns of translation performance consistent with learners' field dependence or independence.

As prior research has noted, cognitive style and language learning can influence each other in a reciprocal manner: while cognitive tendencies shape how learners approach language tasks, the structure of language instruction may also support the development of more effective cognitive habits [14]. The data from this study support this view. Field-independent learners tended to internalize the analytical requirements of translation more effectively during peer review, while field-dependent learners benefited from the opportunity to observe and imitate others' work, fostering awareness and confidence.

Interview responses confirmed these patterns. One field-independent learner reflected that their pre-review translation was primarily driven by sentence structure, but

peer review made them more attentive to grammar, semantics, and punctuation in later revisions. A field-dependent participant noted that having access to peers' work and feedback significantly expanded their understanding of translation, which they found crucial to their improvement.

c) Learning Facilitation Effects of Peer Review Across Cognitive Styles

To investigate the learning outcomes of learners with different field cognitive styles in peer review, this study calculated the mean scores of pre-tests and post-tests for both groups [17]. The results indicate that field-independent learners improved from 62.7 points in the pre-test to 68.4 points in the post-test, a gain of 5.7 points. In contrast, field-dependent learners improved from 51.1 points to 60.2 points, a gain of 9.2 points. Both groups showed significant improvement in their post-test scores compared to their pre-test scores, confirming the positive effect of peer evaluation on both types of learners. Notably, field-dependent learners exhibited a larger increase in scores, which can be attributed to the characteristics of their cognitive style.

Research suggests that field-independent learners prefer working independently and, although they can collaborate in teams, their efficiency tends to decrease in group settings. These learners typically favor engaging with translation theory over hands-on translation practice. In contrast, field-dependent learners thrive in collaborative environments, where they engage more actively in practical translation tasks, avoiding abstract theoretical learning [15]. Interviews with participants further elucidated this: field-independent learners acknowledged the value of peer review but emphasized the importance of teacher guidance and personal effort. Field-dependent learners, on the other hand, highlighted the benefits of hearing diverse perspectives during peer evaluation, which significantly aided their learning.

While field-dependent learners showed greater progress in the peer review activities, their translation abilities were still lower than those of field-independent learners, both in pre-test and post-test scores. Observations from the classroom suggest two possible reasons for this. First, traditional translation instruction, which focuses on sentence-by-sentence analysis and gradually progresses from vocabulary to syntax and discourse structure, aligns more closely with the analytical strengths of field-independent learners. Second, field-independent learners tend to be intrinsically motivated, setting their own learning plans and adhering strictly to them, whereas field-dependent learners are more reliant on external encouragement and praise, which may hinder their development of stronger translation abilities.

4. Conclusions and Pedagogical Implications

The findings of this study reveal that both field-independent and field-dependent learners exhibited a high level of acceptance of peer review feedback. Following the peer review activity, field cognitive style significantly influenced learners' post-test scores, with field-dependent learners showing greater improvement.

Given the strong relationship between field cognitive styles and peer review effectiveness, teachers should tailor peer evaluation activities to the cognitive styles of their students. For field-independent learners, who prefer independent learning, teachers should emphasize the interactive benefits of peer review to increase their engagement. For field-dependent learners, who thrive in group settings but may lack analytical depth, teachers should encourage them to think critically, verify information, and reflect more deeply when engaging in translation, evaluating others, and receiving feedback. This approach will help enhance their translation skills and the reliability of their evaluations.

In the broader context of translation instruction, teachers should consider individual differences in cognitive styles when delivering language knowledge and translation skills. Using authoritative assessments to understand students' cognitive styles can help in adopting differentiated teaching strategies. For instance, field-dependent learners can be

guided to engage in more independent and critical thinking through translation appreciation activities, while field-independent learners can be encouraged to leverage their strengths in information processing while practicing more collaboratively. As noted by Carrell and Monroe, aligning teaching design with students' learning preferences maximizes foreign language acquisition. Additionally, teachers should assist learners in understanding their cognitive style's strengths and weaknesses, helping them optimize their learning experiences and outcomes.

For learners, setting personalized learning goals and plans according to their cognitive styles is crucial. Cognitive styles are not fixed; they are variable dimensions that can be adjusted depending on the task at hand. For instance, learners may apply a field-dependent style in tasks involving academic communication and a field-independent style when analyzing translation issues, thereby optimizing their learning outcomes by leveraging the strengths of both cognitive styles.

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