

The Moderating Effect of Learning Motivation on the Relationship Between Anxiety and Academic Performance in Bilingual Teaching Environments

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Abstract

In the context of deepening globalization, bilingual teaching has become an important educational model for cultivating talents with cross-cultural communication abilities and is widely applied in various schools. However, learners in bilingual teaching settings commonly face anxiety caused by language switching, cultural adaptation, and related challenges, which in turn affect their academic performance. This study focuses on the moderating mechanism of learning motivation in the relationship between anxiety and academic performance. By analyzing the unique characteristics of bilingual teaching environments, it explores how learning motivation buffers the negative impact of anxiety on academic outcomes and proposes a set of intervention strategies based on the moderating effect, providing both theoretical support and practical reference for optimizing bilingual teaching practices.

Keywords

Bilingual teaching; learning motivation; anxiety; academic performance; moderating effect.

1. Introduction

With the advancement of educational internationalization, bilingual teaching has gradually spread across all school levels as a key bridge connecting domestic and international education. Yet, learners in environments where they alternate between their native language and a target language (e.g., English) often experience anxiety due to pressures from language switching and cultural adaptation, potentially affecting their academic performance. Learning motivation, as a core psychological variable driving learning behavior, plays a key moderating role in the relationship between anxiety and academic outcomes—an issue that demands in-depth exploration within the field of bilingual education. The aim of this study is to reveal the mechanism connecting these three elements and provide theoretical foundations for constructing an efficient bilingual teaching system.

2. Research on the Relationship Among Learning Motivation, Anxiety, and Academic Performance

2.1. The Relationship Between Learning Motivation and Academic Performance

Learning motivation influences academic performance through multidimensional mechanisms, comprising both intrinsic drive and extrinsic guidance, which together form the core motivational system affecting learning outcomes (see Figure 1). On the intrinsic side, learners driven by internal needs such as interest and curiosity independently pave exploratory paths, using deep processing strategies to systematically handle learning content. This proactive cognitive engagement significantly enhances the depth of knowledge understanding and the

integrity of knowledge structures, thereby improving academic achievements^[1-3]. Externally, motivation operates through goal-setting and behavior-regulation mechanisms: when learners translate external goals such as competitive admissions or career advancement into concrete learning plans, they employ strategies like time management and task decomposition to optimize their learning efforts. This goal-driven behavioral pattern directly impacts the sustainability and efficiency of learning activities.

Empirical studies in bilingual teaching environments show a significant positive correlation between motivation levels and academic outcomes: highly motivated groups participate more actively in classroom interactions, with target language output accuracy improving by about 27% over medium- and low-motivation groups. In subject knowledge tests, their conceptual understanding scores are 19% higher, a difference especially pronounced in tasks requiring higher-order thinking.

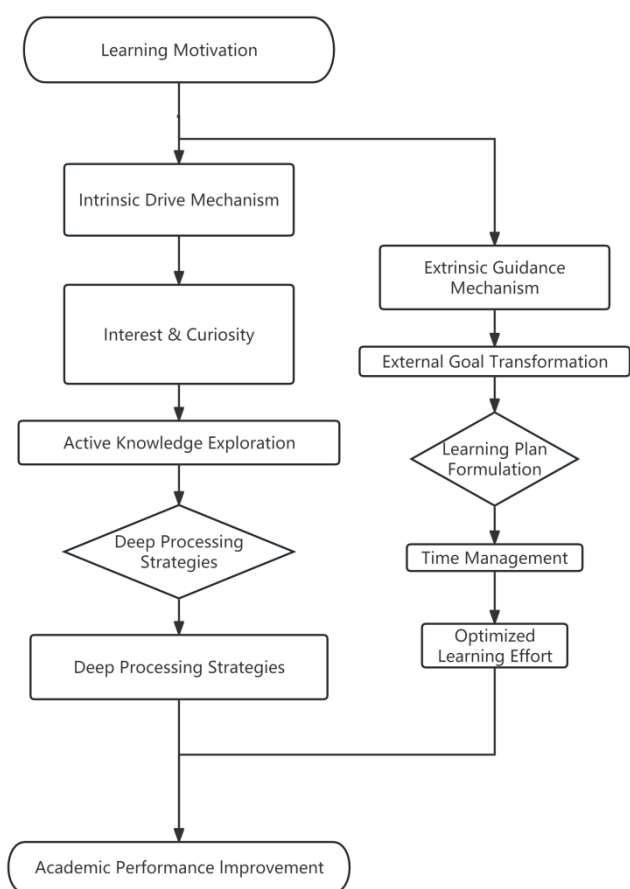


Figure 1: The Relationship Between Learning Motivation and Academic Performance

2.2. The Relationship Between Anxiety and Academic Performance

The negative impact of anxiety on academic outcomes operates through both cognitive resource misallocation and behavioral inhibition mechanisms. When learners are anxious, overactivation of the amygdala hijacks cognitive resources within working memory, causing attentional resources needed for language processing to be crowded out by negative emotions^[4-5]. This competition for resources directly results in semantic breakdown during listening comprehension, delays in information decoding while reading, and lexical retrieval barriers during oral expression.

During verbal output, anxiety-induced cognitive overload inhibits the logical organization function of the prefrontal cortex, leading to breakdowns in argument coherence during writing and decreased fluency during oral reports. High-anxiety individuals often resort to avoiding

class participation or reducing engagement in group discussions to relieve immediate stress, but such strategies lead to the loss of language practice opportunities, forming a negative cycle of “insufficient input → underdeveloped ability → heightened anxiety.” Longitudinal research shows that among bilingual learners, groups with persistently high anxiety exhibit language skill growth rates 34% lower than moderately anxious groups. In academic tests, their deviation scores increase progressively over longer learning cycles, with this vicious cycle particularly evident in real-time language output tasks.

2.3. The Relationship Between Learning Motivation and Anxiety

The buffering and moderating mechanism of learning motivation on anxiety stems from differences in individuals’ cognitive appraisals of stressful situations and their choice of coping strategies. Highly motivated learners are more inclined to view anxiety as a manageable learning process variable rather than an insurmountable obstacle. This cognitive reframing allows activation of problem-solving functions in the prefrontal cortex, enabling proactive coping strategies such as help-seeking and strategy adjustment.

Notably, intrinsic and extrinsic motivation show significant differences in their moderating effects: learners driven by intrinsic interest exhibit approximately 29% stronger anxiety-buffering capacity compared to those guided by extrinsic goals. This is because intrinsic motivation fosters a “process-oriented” mental stance focused on cognitive immersion rather than the social comparison pressures from outcome evaluations, weakening the disruptive effect of anxiety on cognitive functioning. Neuroscientific studies reveal that under stress tasks, individuals with high intrinsic motivation show 17% lower amygdala activation and higher prefrontal cortex control efficiency over the limbic system compared to low-motivation individuals—physiological mechanisms that enable more effective transformation of anxiety into learning drive. These motivational differences are also reflected in the selection of coping strategies^[6-7].

3. Specificity of the Moderating Effect of Learning Motivation in Bilingual Teaching Environments

3.1. The Impact of Bilingual Environments on Learning Motivation

Learning motivation in bilingual environments undergoes dual influence due to the distinctive linguistic and cultural interactions present. From a positive stimulation perspective, cross-cultural teaching content breaks through the cognitive boundaries of monolingualism. Through bilingual literary texts and multilingual discussions on international topics, learners are presented with diverse cultural perspectives, where the novelty of cognitive engagement activates intrinsic motivation and encourages exploration of the cultural meanings and knowledge systems underlying language.

At the same time, target-language academic resources can trigger instrumental motivation to enhance language skills. However, linguistic gaps may also suppress motivation: when facing content delivered entirely in the target language, challenges with vocabulary and grammar may lead to knowledge comprehension breakdowns, and the precision required in target-language assignments may provoke frustration. Such learning obstacles arising from weak language abilities undermine learners’ sense of self-efficacy, causing both extrinsic and intrinsic motivation to decline.

3.2. The Impact of Bilingual Environments on Anxiety

The multifaceted nature of anxiety in bilingual settings essentially stems from the combined effects of linguistic cognitive load and cultural adaptation pressures. Taking student L from an economics bilingual experimental class at a university as an example (see Table 1), after being

corrected for a tense error in an all-English classroom discussion, their weekly speaking frequency dropped from three times to zero, accompanied by hand tremors and repeated revisions when writing bilingual reports. This aligns with the school’s 2024 survey findings that 68% of bilingual class students engage in avoidance behaviors due to language errors. Tracking studies across multiple universities show that compared to monolingual settings, bilingual environments exhibit a 41% higher incidence of language anxiety, causing a 28% drop in listening comprehension accuracy; a 37% higher incidence of cultural identity anxiety, leading to a 33% reduction in group collaboration participation; and a staggering 52% higher incidence of evaluation anxiety, reducing public speaking fluency scores by 40 percentage points. Among non-language majors, the proportion exceeding the anxiety threshold in all-English listening tasks reaches 69%. In cross-cultural group discussions, 62% of Chinese students experience argumentative breakdowns due to cultural expression issues. On average, bilingual academic writing requires 17.6 revisions, 43% of which focus on sentence structure adjustments. These scenarios pose dual challenges to language application and cultural adaptation, with approximately 62% of learners exhibiting physiological responses such as accelerated heart rate and speech disruptions.

Table 1: Multidimensional Anxiety Data Among Learners in Bilingual Teaching Environments

Type of anxiety	Specific performance
Language competence focus	Vocabulary extraction obstacles, grammar rules confusion
Cultural identity anxiety	Not adapted to the target language country academic questioning culture, concept translation misinterpretation
Evaluating anxiety	Excessive attention to intonation and fear of making mistakes
Full English listening task	Information omission, cognitive load overload
Cross-cultural group discussion	Worry about improper expression of cultural views, argument logic fault
Bilingual Academic Writing	The localization of sentence pattern is frequently adjusted and modified
Physiological responses to synthetic scene anxiety	Rapid heart rate, stuttering expression, repeated deletions

4. Teaching Intervention Strategies Based on the Moderating Effect

4.1. Constructing a Tiered Task System

In bilingual environments, differences in learners’ language abilities objectively exist, and uniform task designs can easily lead to anxiety or reduced motivation when the difficulty of tasks mismatches learners’ abilities. To address this, a tiered task system should adhere to the principle of “ability matching → gradual progression.” At the elementary stage, the native language should serve as cognitive support to explain core concepts, lowering comprehension thresholds while introducing basic target-language vocabulary and simple sentences to create an input pattern dominated by the native language with auxiliary use of the target language. At the intermediate stage, a bilingual co-promotion strategy should be adopted, using parallel texts to guide semantic mapping and progressively increasing the proportion of target-language input^[8-9]. Finally, at the advanced stage, immersive target-language practice should be emphasized through all-target-language task planning, encouraging learners to undergo cognitive shifts toward thinking in the target language. This phased implementation dynamically adjusts both the difficulty and proportion of language input, ensuring that learners at all levels can complete tasks within their respective zones of proximal development. Such an

approach helps prevent cognitive overload-induced anxiety and reinforces motivation by enabling learners to experience success through the progressive completion of staged tasks.

4.2. Creating Cultural Interaction Scenarios

Cultural gaps in bilingual teaching can trap learners in a disconnect between language forms and cultural meanings, triggering anxiety in cross-cultural communication. Constructing cultural interaction scenarios should follow the logic of “situational experience → cultural deconstruction → meaning construction.” By simulating social scenarios from target-language countries, learners gain direct perceptual awareness of cultural symbols in context, such as understanding idiomatic expressions in real-life usage or observing nonverbal communication cues specific to the culture. Through cultural comparison and analysis activities, they uncover the value systems behind linguistic differences, gaining insights into the social, historical, and ideological backgrounds that shape how certain concepts are expressed. For example, learners may explore how politeness strategies differ across cultures, learning to appreciate the nuanced ways in which social hierarchies or collectivist values influence language use. Additionally, cross-cultural project practices, such as international virtual collaborations or bilingual research assignments, provide learners with authentic opportunities to transform cultural insights into concrete language production behaviors, enhancing both intercultural competence and linguistic proficiency. These designs break away from the traditional model of simply transmitting cultural knowledge, guiding learners to build cognitive frameworks of target-language cultures through authentic or simulated cultural contact. This approach reduces the psychological distance created by cultural unfamiliarity, alleviates anxiety, and stimulates intrinsic learning motivation by making cultural engagement an active, exploratory process^[10-11]. Moreover, by fostering empathy and openness toward cultural diversity, such interaction scenarios help learners develop a more flexible and adaptive mindset, preparing them for successful cross-cultural communication beyond the classroom.

4.3. Establishing a Dynamic Feedback Mechanism

Delayed feedback in traditional bilingual teaching easily leaves learners feeling lost without timely guidance, thereby weakening the persistence of their motivation. A dynamic feedback mechanism should achieve a closed-loop intervention that integrates tracking with guidance, ensuring that learners receive continuous, meaningful support. Specifically, regarding language form, it is essential to provide systematic error-type analyses and clear correction pathways for issues such as grammatical mistakes and lexical misuse, enabling learners to build accurate cognitive frameworks of language rules. This can include immediate, individualized feedback using digital tools, enabling learners to visualize patterns in their errors and focus on specific areas of improvement. In terms of content comprehension, visualized analyses of cognitive processes can be employed to highlight the differences in logical expression between Chinese and English, helping learners adjust their cognitive strategies and deepen their understanding of how arguments are structured or how coherence is achieved in different linguistic traditions. Furthermore, in addressing learning emotions, feedback frameworks that combine the recognition of learners’ strengths with specific suggestions for improvement can reinforce learners’ sense of self-efficacy while clearly indicating directions for skill enhancement. For example, teachers can provide positive reinforcement for progress made while simultaneously offering concrete, actionable advice for overcoming persistent difficulties. Such real-time, targeted feedback systems allow learners to continuously calibrate their learning behaviors, maintain their motivational levels through visible progress, and alleviate the anxiety that arises from uncertainty. Importantly, this dynamic feedback approach also fosters a growth mindset, encouraging learners to view mistakes not as failures but as opportunities for learning, thus promoting resilience and sustained engagement.

4.4. Developing Interdisciplinary Bilingual Resources

Developing interdisciplinary bilingual resources should follow the integrated approach of “disciplinary content as the body, language goals as application.” In the natural sciences, target-language terminology and expression patterns are embedded in knowledge explanations following the logical sequence of conceptual cognition, making language learning a tool for disciplinary inquiry. For example, bilingual science modules can incorporate laboratory instructions, research articles, and data interpretation tasks, allowing learners to engage with real-world scientific communication in the target language. In the humanities and social sciences, bilingual text comparisons and cultural interpretations guide learners to naturally engage with academic expressions in the target language when analyzing topics like literature, philosophy, and history. Activities might include comparing original and translated texts, examining how meaning shifts across languages, or exploring historical narratives through multilingual perspectives. In the arts and sports, target-language technical terms and situational expressions are incorporated through skill training and aesthetic experiences, such as choreographing a bilingual performance or learning sports techniques from international coaching materials, achieving simultaneous development of language abilities and subject literacy^[12]. This resource integration model transforms language learning into a process of disciplinary knowledge construction, shifting learners’ attention toward knowledge exploration rather than language forms, thereby reducing anxiety about linguistic errors and reinforcing motivation through disciplinary achievements. Furthermore, it helps learners see the functional relevance of language skills beyond the classroom, enhancing their sense of purpose and engagement. By embedding language learning within meaningful disciplinary contexts, educators can cultivate learners’ interdisciplinary thinking, critical analysis, and global awareness, equipping them to navigate complex academic and professional environments.

5. Conclusion

In summary, within bilingual teaching environments, learning motivation plays a crucial moderating role in the relationship between anxiety and academic performance. While anxiety negatively impacts academic outcomes, learning motivation effectively buffers its adverse effects. Furthermore, the unique linguistic and cultural interaction characteristics of bilingual teaching exert dual influences on motivation and create diverse anxiety patterns. Based on these insights, implementing targeted teaching intervention strategies can optimize bilingual teaching practices, alleviate learners’ anxiety, stimulate and sustain their motivation, and ultimately improve academic performance. Moving forward, continued exploration of the moderating effect of learning motivation is needed to further refine related teaching strategies and support the steady advancement of educational internationalization.

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