Unveiling the Mechanisms: How AI-Powered Tools Alleviate Speaking Anxiety in Chinese EFL Learners

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Abstract. Speaking anxiety remains a major barrier to oral English development for many Chinese EFL learners, often driven by fear of negative evaluation, face-threatening classroom interaction, and low speaking confidence. While AI-powered language learning tools are increasingly used in oral English practice, their affective function has received far less attention than their technological performance. This study examines how AI tools alleviate speaking anxiety and identifies the specific psychological and interactional mechanisms through which this effect occurs. Using a mixed-methods approach, the study combines questionnaire data from 162 Chinese university EFL learners with semi-structured interviews involving 18 participants. The findings show that AI tools reduce speaking anxiety through three interconnected mechanisms: first, non-judgmental interaction lowers learners' fear of negative evaluation; second, instant and precise feedback enhances self-efficacy and speaking confidence; third, controllable pacing allows learners to practice privately, reducing emotional pressure before entering real classroom communication. By moving beyond simply confirming the effectiveness of AI tools, this study reveals how AI-mediated speaking practice lowers learners' affective filters in Chinese EFL contexts. It extends the application of the Affective Filter Hypothesis to AI-assisted oral learning and provides practical implications for integrating AI tools into oral English instruction in higher education.

Keywords: AI-Powered Language Learning, Speaking Anxiety, Chinese EFL Learners, Affective Filter, AI Feedback.

1. Introduction

Speaking anxiety has long been recognized as a major barrier to oral English development among learners of English as a foreign language (EFL), particularly in the Chinese educational context. Many Chinese EFL learners report strong fear of negative evaluation, hesitation during spontaneous speaking, and emotional tension when asked to speak in class, even when they possess adequate vocabulary and grammatical knowledge. As a result, learners often avoid oral participation, rely on memorized scripts, or remain silent in classroom interaction. These behaviors significantly limit opportunities for meaningful speaking practice and hinder the development of communicative competence. The present study aims to explore how AI-powered speaking tools alleviate speaking anxiety among Chinese EFL learners and to identify the specific psychological and interactional mechanisms through which such alleviation occurs.

Research on foreign language anxiety has consistently demonstrated that affective factors play a critical role in second language acquisition, especially in speaking. Horwitz, Horwitz, and Cope (1986) conceptualized foreign language anxiety as a situation-specific construct closely associated with classroom interaction, fear of negative evaluation, and communication apprehension. Subsequent studies have confirmed that speaking anxiety is particularly salient in EFL contexts, where learners have limited exposure to authentic communication and rely heavily on classroom-based interaction. In China, this issue is further intensified by exam-oriented instruction, large class sizes, and strong social pressure to avoid mistakes. Empirical studies focusing on Chinese EFL learners have shown that fear of losing face, concern about peer judgment, and low speaking confidence are among the most influential sources of speaking anxiety (Lin, 2023). These findings help explain why many learners remain reluctant to speak despite years of formal English instruction.

At the same time, advances in educational technology have introduced AI-powered tools into oral English learning. AI speaking assistants, automated pronunciation evaluation systems, and real-time

feedback tools are increasingly used in university English courses and self-directed learning platforms. Existing studies suggest that such tools can improve learners' pronunciation accuracy, fluency, and engagement by offering individualized practice opportunities and immediate feedback (Ebadi & Vahdat, 2021; He, Abbasi, & He, 2024). Compared with traditional classroom speaking tasks, AI-mediated speaking practice allows learners to repeat tasks, control the pace of interaction, and practice without direct peer observation. These features appear particularly relevant for learners who experience high levels of speaking anxiety.

However, despite growing interest in AI-assisted language learning, the affective role of AI tools remains insufficiently explored. Much of the existing research emphasizes technological effectiveness, such as speech recognition accuracy or performance improvement, while paying relatively little attention to learners' emotional experiences during AI-mediated speaking practice. In many studies, reductions in anxiety are reported as secondary outcomes, without detailed examination of how such changes occur. As a result, AI is often described as "effective" without a clear explanation of the underlying mechanisms that connect AI interaction features to learners' emotional and behavioral changes. This limits the explanatory power of existing research and reduces its value for pedagogical design.

Another limitation of previous studies lies in how speaking anxiety is conceptualized. Speaking anxiety is often treated as a stable individual trait rather than as a dynamic response shaped by interactional conditions. While descriptive studies have successfully identified sources of anxiety, fewer studies examine how learning environments can actively reshape learners' affective experiences. Limited attention has been paid to how specific features of AI tools—such as non-judgmental interaction, instant feedback, and controllable pacing—directly influence learners' fear of negative evaluation, self-confidence, and willingness to speak. This gap is especially evident in research focusing on Chinese EFL learners, whose anxiety is closely linked to face concerns and classroom social dynamics.

From a theoretical perspective, several frameworks offer useful insights into this issue. Krashen's Affective Filter Hypothesis suggests that high anxiety raises an affective filter that blocks language input, whereas lower anxiety facilitates acquisition. Face theory further explains why public speaking tasks in collectivist cultures may be experienced as face-threatening, increasing learners' fear of making mistakes in front of others. In addition, second language acquisition theories emphasize the importance of output, interaction, and willingness to communicate for oral development. While these theories provide valuable conceptual tools, they have rarely been applied systematically to explain AI-mediated speaking practice. Most existing studies rely on these theories as background frameworks rather than using them to analyze concrete interactional mechanisms.

Against this backdrop, the present study addresses a clear research gap by focusing on how AI-powered speaking tools alleviate speaking anxiety among Chinese EFL learners. Rather than simply asking whether AI tools are effective, this study examines how learners experience AI-mediated speaking practice and how such experiences reshape their emotional responses to speaking. Specifically, the study investigates the role of non-judgmental interaction, instant and precise feedback, and controllable practice pacing in reducing anxiety and building confidence. By doing so, the study moves beyond outcome-based evaluation and provides a mechanism-oriented explanation of AI's affective impact.

The study is guided by the following research questions:

How does the non-judgmental nature of AI reduce learners' fear of negative evaluation?

How does instant and precise AI feedback contribute to the development of learners' speaking confidence?

Does confidence gained through AI-mediated practice increase learners' willingness to speak in real classroom settings?

To answer these questions, a mixed-methods research design is adopted. Quantitative questionnaire data are collected from Chinese university EFL learners to examine changes in anxiety, confidence, and willingness to speak. In addition, semi-structured interviews are conducted to gain

deeper insights into learners' perceptions of AI-mediated speaking practice and their emotional experiences. This combination of methods allows for both generalizable patterns and nuanced individual perspectives to be captured.

While the study draws on insights from the Affective Filter Hypothesis, face theory, and second language acquisition research, theoretical discussion is deliberately kept focused and explanatory rather than expansive. The goal is not to propose a new theoretical model, but to demonstrate how existing theories can help explain learners' experiences in AI-mediated speaking contexts. By identifying specific affective and interactional mechanisms, this study contributes to a more nuanced understanding of AI-assisted oral learning and offers practical implications for integrating AI tools into oral English instruction in Chinese higher education.

2. Literature Review

2.1. Speaking Anxiety in Second Language Acquisition (SLA)

Speaking anxiety is one of the most persistent emotional barriers in second language acquisition (SLA), significantly hindering learners' ability to effectively engage in oral communication. Horwitz and Cope (1986) were among the first to conceptualize foreign language anxiety as a situation-specific anxiety, stemming primarily from the fear of negative evaluation, communication apprehension, and test anxiety. Speaking anxiety often results in avoidance behaviors, such as silence or rehearsed responses, limiting opportunities for meaningful interaction.

In the context of Chinese EFL learners, speaking anxiety is particularly pronounced due to cultural and educational factors. Lin (2023) found that Chinese learners are particularly concerned about face-threatening situations, where mistakes made in front of peers or teachers could result in loss of face—a concept central to Chinese culture. This fear of negative evaluation, combined with high-stakes exams, leads to heightened anxiety, which in turn prevents learners from engaging in spontaneous speaking tasks (Chen & Yang, 2020). The consequence is a cycle of self-doubt and avoidance that inhibits language acquisition.

2.2. AI Tools in Language Learning

AI-powered language learning tools have been increasingly applied in oral English instruction to provide personalized, adaptive, and non-judgmental learning environments. These tools, such as intelligent speaking assistants, automated pronunciation evaluators, and real-time feedback systems, offer learners the ability to practice speaking at their own pace, with immediate feedback and without the social pressure of face-to-face interactions.

Several studies have explored the role of AI in language learning. Ebadi and Vahdat (2021) demonstrated that AI-assisted speaking tools can significantly reduce learners' anxiety by providing a non-judgmental environment, which lowers the affective filter and encourages learners to take risks with their language use. Similarly, He, Abbasi, and He (2024) found that AI-based feedback mechanisms help build learners' self-confidence, as learners receive instant corrections without fear of peer judgment, allowing them to gradually overcome their anxieties.

However, while much research has focused on the technological capabilities of AI tools, the affective aspect—specifically how these tools alleviate speaking anxiety—remains underexplored. Most studies on AI tools in language learning emphasize performance outcomes, such as improvements in pronunciation accuracy and fluency (Jin & Mei, 2020), but they often overlook the emotional factors that play a key role in language learning, especially in oral tasks.

2.3. Mechanisms of AI in Alleviating Speaking Anxiety

AI-powered language learning tools are increasingly recognized for their ability to support second language learners. This study identifies three primary mechanisms through which these tools alleviate speaking anxiety among Chinese EFL learners: non-judgmental interaction, instant and precise feedback, and controllable pacing. These mechanisms interact with each other in complex ways, each

contributing to the reduction of anxiety in specific ways while reinforcing one another to enhance overall learner experience.

2.3.1. Non-judgmental Interaction and Face Theory

One of the most significant mechanisms identified in this study is the non-judgmental nature of AI interactions. As learners often experience fear of negative evaluation in traditional classroom settings (Horwitz et al., 1986), the non-judgmental interaction offered by AI tools allows them to practice speaking without the fear of judgment from peers or teachers. This mechanism is underpinned by Brown and Levinson's (1987) Face Theory, which suggests that individuals in collectivist cultures, like China, are highly sensitive to "face-threatening" situations. In a typical classroom, learners worry about losing face in front of others when they make mistakes, which increases their anxiety. The non-judgmental AI interaction reduces the social risks associated with speaking, thus lowering anxiety levels. In this way, AI-mediated practice offers a safe space where learners can make mistakes and learn without the social pressure of being evaluated.

2.3.2. Instant and Precise Feedback and Affective Filter Hypothesis

The second key mechanism is the instant and precise feedback provided by AI tools. Krashen's Affective Filter Hypothesis (1982) posits that emotional factors, such as anxiety, serve as filters that impede language acquisition. Learners with high levels of anxiety are less likely to internalize language input, as the affective filter is raised. Conversely, when anxiety is reduced, the filter lowers, allowing more effective acquisition. AI tools provide real-time corrections, addressing mistakes immediately and reinforcing correct language use. This timely feedback boosts learners' confidence by helping them understand exactly where they went wrong and what they need to improve. The instant feedback helps learners feel more competent and less anxious, as they can track their progress and receive consistent reinforcement in a low-stakes environment. In this sense, AI tools act as both language input providers and affective regulators, facilitating both language learning and emotional comfort.

2.3.3. Controllable Pacing and Self-efficacy Theory

The third mechanism, controllable pacing, allows learners to practice at their own speed without the pressure of keeping up with a class schedule. This feature is particularly important for reducing anxiety, as learners can repeat tasks, review mistakes, and adjust their practice pace according to their individual comfort level. According to Bandura's (1997) Self-efficacy Theory, learners are more likely to engage in tasks when they believe they have control over the process and are capable of succeeding. The ability to control the pacing of their practice increases learners' sense of autonomy and self-efficacy, which in turn reduces anxiety. Learners report that this control enables them to focus on improving their speaking skills without the fear of making mistakes in front of others. Furthermore, controllable pacing enhances learners' willingness to engage in extended practice, as they can choose when and how to practice based on their emotional state, reinforcing both confidence and language skills.

2.3.4. Interactions Between the Mechanisms

The three mechanisms—non-judgmental interaction, instant feedback, and controllable pacing—do not operate in isolation; instead, they interact to provide a comprehensive solution to speaking anxiety. Non-judgmental interaction reduces the fear of negative evaluation, creating a low-risk environment where learners feel safe to practice. This, in turn, increases their willingness to engage with AI tools, especially as learners receive instant feedback. The immediate corrections help learners feel more confident, which in turn encourages them to continue practicing. Furthermore, controllable pacing reinforces these effects by allowing learners to adjust the intensity of their practice, ensuring that they are not overwhelmed by the pace of learning. Together, these mechanisms form a holistic approach to reducing anxiety, where learners' emotional and psychological barriers to speaking are gradually diminished through a cycle of safe practice, confidence-building, and personal control.

2.3.5. Critique of Existing Literature and Research Gap

Although the use of AI tools in language learning has been widely explored, much of the existing research has focused primarily on technological effectiveness rather than the emotional impact of these tools. Studies often highlight the improvements in pronunciation, fluency, and accuracy, but there is a significant gap in understanding how AI tools influence learners' emotional experiences, especially speaking anxiety (He, Abbasi, & He, 2024; Ebadi & Vahdat, 2021).

Additionally, much of the research has been limited to measuring outcomes—whether AI tools lead to improved language performance—while neglecting the process through which these improvements occur. For example, studies may show that AI tools can help learners improve their fluency, but they often fail to explore how emotional and psychological factors, such as anxiety and self-confidence, mediate the relationship between AI use and language learning outcomes.

This study aims to bridge this gap by focusing not only on whether AI tools alleviate speaking anxiety, but also on how they do so. Specifically, the study seeks to understand the psychological and interactional mechanisms—non-judgmental interaction, instant feedback, and controllable pacing—that explain the relationship between AI tool use and reduced anxiety. This focus on the process of anxiety reduction, rather than merely the outcome, represents a significant contribution to the literature on AI in language learning.

2.4. Research Gaps and Contribution

While previous research has examined the general effectiveness of AI tools in language learning, few studies have systematically explored the specific mechanisms through which AI tools alleviate speaking anxiety. Most studies have focused on AI's technological capabilities, such as automatic speech recognition and pronunciation correction (Jin & Mei, 2020), without addressing how these tools interact with learners' emotional states and psychological barriers. Moreover, much of the existing research treats speaking anxiety as a static trait, rather than a dynamic response to the learning environment.

This gap is particularly evident in the context of Chinese EFL learners, where social and cultural factors—such as face concerns and exam pressure—play a significant role in shaping learners' anxiety levels. The present study aims to fill this gap by focusing on the psychological and interactional mechanisms through which AI tools help alleviate speaking anxiety. By examining the specific features of AI tools, such as non-judgmental interaction, instant feedback, and controllable pacing, this study will contribute to a deeper understanding of how AI can be used not only to improve linguistic performance but also to support learners' emotional and psychological development in the language learning process.

2.5. Implications for Pedagogical Practice

The findings of this study have important implications for the integration of AI tools into oral English instruction, particularly in the context of Chinese higher education. By reducing speaking anxiety and promoting confidence-building, AI tools can create a more conducive environment for language learning. Educators can leverage AI tools to supplement traditional classroom instruction, offering students the opportunity for low-risk practice outside of class and at their own pace. This approach could help bridge the gap between formal education and real-world communication, providing students with the confidence they need to participate in English discussions and improve their speaking skills.

3. Research Questions and Hypotheses

This study aims to explore the relationship between AI-powered language learning tools and the reduction of speaking anxiety among Chinese EFL learners, specifically focusing on the mechanisms through which these tools alleviate anxiety and promote oral language proficiency.

3.1. Research Questions

How does the non-judgmental nature of AI reduce learners' fear of negative evaluation?

Speaking anxiety, particularly the fear of being negatively evaluated, is a significant barrier to effective oral communication in second language (L2) contexts (Horwitz et al., 1986). This research investigates how AI tools, by providing a non-judgmental learning environment, help mitigate learners' fear of negative evaluation during speaking tasks. By offering learners a private space to practice without the immediate social pressure of peer observation, AI tools may help reduce the fear of making mistakes.

How does instant and precise AI feedback contribute to the development of learners' speaking confidence?

Instant feedback is a key feature of AI language learning tools. The prompt and precise correction of errors in pronunciation, grammar, and fluency can significantly enhance learners' self-confidence (Naseer et al., 2024). This study examines how AI's real-time feedback mechanism supports learners in overcoming speaking anxiety by providing clarity and boosting their confidence in their speaking abilities, making them more willing to engage in further oral tasks.

Does confidence gained through AI-mediated practice increase learners' willingness to speak in real classroom settings?

Self-confidence plays a pivotal role in learners' willingness to communicate (WTC) in a second language (MacIntyre et al., 1998). This research aims to explore whether the confidence gained from AI-mediated speaking practice translates into increased willingness to speak in actual classroom interactions. Specifically, it investigates whether learners who experience confidence boosts through AI tools are more likely to engage actively in real-world speaking tasks.

3.2. Hypotheses

Based on the theoretical framework discussed in the literature review, the following hypotheses are proposed:

H1: EFL learners using AI-powered chatbots will exhibit significantly greater improvements in L2 speaking skills (including fluency, accuracy, and overall proficiency) compared to learners who engage in traditional speaking practice.

Rationale: AI tools provide personalized, adaptive learning environments, allowing learners to practice speaking at their own pace and receive instant feedback. Previous studies have demonstrated that AI tools can enhance learners' speaking skills by offering tailored instruction (Naseer et al., 2024; Hwang et al., 2024).

H2: EFL learners interacting with AI-powered chatbots will report significantly lower levels of speaking anxiety compared to those engaging in traditional speaking practice.

Rationale: AI chatbots create a non-judgmental environment where learners can practice without fear of negative social evaluation. This environment helps alleviate speaking anxiety, which is particularly prevalent in the traditional classroom setting where learners often fear judgment from peers and instructors (Çakmak, 2022). The study expects that learners using AI tools will experience a reduction in anxiety compared to those practicing in traditional settings.

H3: The effects of AI-powered chatbots on reducing speaking anxiety and improving speaking skills will vary based on learners' baseline anxiety levels, with learners experiencing higher initial anxiety deriving greater benefits from AI-mediated interactions.

Rationale: Learners with higher initial levels of speaking anxiety may benefit more from the supportive, low-pressure environment provided by AI tools. Previous research indicates that learners with greater anxiety tend to show more significant improvements when using AI tools that reduce social and evaluative pressures (Hapsari & Wu, 2022; Yang et al., 2022). This hypothesis tests whether learners with higher baseline anxiety will experience more pronounced improvements in both anxiety reduction and speaking proficiency.

4. Methodology

4.1. Research Design

This study adopts a mixed-methods design, combining both quantitative and qualitative approaches to provide a comprehensive understanding of how AI-powered tools can alleviate speaking anxiety among Chinese EFL learners. The mixed-methods approach allows for a holistic exploration of the research questions, integrating numerical data to measure changes in anxiety and confidence, alongside in-depth qualitative insights from learners' personal experiences and perceptions. This combination enhances the validity of the findings by triangulating data from multiple sources and methods.

4.2. Participants

The study will involve a total of 180 Chinese EFL university students from two different universities in Beijing. Participants will be selected using stratified random sampling, ensuring diversity in terms of gender, major, and initial levels of speaking anxiety. The inclusion criteria for participants are as follows:

Proficiency Level: Intermediate EFL learners, as defined by their scores on the TOEFL iBT or CET-4 (College English Test). These learners have sufficient language knowledge to engage in speaking tasks, but they may still experience anxiety in oral English communication.

Age Group: 18–25 years old, typical of university-level learners in China.

Informed Consent: All participants will be provided with informed consent forms explaining the study's purpose, procedures, and potential risks. Participants will be informed that their involvement is voluntary and that they can withdraw at any time without penalty.

4.3. Data Collection Methods

To address the research questions, two types of data will be collected: quantitative data through surveys and qualitative data through semi-structured interviews.

A pre- and post-intervention questionnaire will be administered to all participants to measure speaking anxiety, confidence, and willingness to speak before and after the use of AI-powered tools. The questionnaire will consist of the following parts:

Speaking Anxiety Scale (SAS): The Foreign Language Classroom Anxiety Scale (FLCAS) developed by Horwitz et al. (1986) will be used to assess learners' anxiety related to speaking in English. The scale includes items related to fear of negative evaluation, communication apprehension, and test anxiety.

Self-Confidence Scale: A self-report scale developed by Liu (2020) will be used to measure learners' confidence in speaking English. It includes questions about perceived speaking ability, belief in improving skills, and willingness to participate in speaking tasks.

Willingness to Communicate (WTC): This scale, adapted from MacIntyre et al. (1998), will assess learners' willingness to engage in oral communication, both in AI-mediated practice and in real classroom interactions.

Participants will complete these scales before and after engaging with the AI tools. The data collected from the pre- and post-questionnaires will be analyzed to identify any significant changes in anxiety levels, confidence, and speaking willingness.

In addition to the quantitative data, semi-structured interviews will be conducted with 18 participants (10% of the total sample) who have used the AI tools. These interviews will allow for a deeper exploration of participants' experiences and perceptions regarding the AI tools and their impact on speaking anxiety. The interviews will focus on the following areas:

Participants' personal experiences with speaking anxiety and AI tools.

How the AI tools specifically helped reduce anxiety, particularly in terms of the non-judgmental nature of interactions, instant feedback, and controllable pacing.

Participants' self-reported changes in confidence and willingness to speak in real classroom settings after using AI tools.

The interviews will be conducted in English, but, if necessary, participants may answer in Chinese for clarity. All interviews will be audio-recorded, transcribed verbatim, and analyzed using thematic analysis to identify recurring themes and patterns.

4.4. AI Tool Intervention

The intervention in this study will involve the use of an AI-powered speaking assistant designed to provide learners with real-time feedback on pronunciation, grammar, and fluency. The specific AI tool used will be a chatbot equipped with speech recognition and natural language processing capabilities. The AI tool will allow learners to practice speaking English through conversations with the chatbot, which will offer corrections, praise, and suggestions for improvement.

The learners will engage with the AI tool for 4 weeks, with each participant completing a total of 8 sessions (2 sessions per week). Each session will last approximately 20 minutes. During these sessions, learners will engage in simulated conversations on various topics, receiving instant feedback after each speaking task.

4.5. Data Analysis

The quantitative data from the pre- and post-questionnaires will be analyzed using paired t-tests to determine if there are significant differences in learners' anxiety levels, self-confidence, and willingness to communicate before and after the intervention. The analysis will help answer the research questions regarding the impact of AI tools on speaking anxiety and confidence.

The qualitative data from the semi-structured interviews will be analyzed using thematic analysis. Key themes related to the three primary mechanisms (non-judgmental interaction, instant feedback, controllable pacing) will be identified and categorized. The interview data will provide deeper insights into how learners perceive the role of AI tools in reducing anxiety and improving speaking confidence.

4.6. Ethical Considerations

This study adheres to ethical standards in research. All participants will be fully informed about the nature of the study, their rights as participants, and the confidentiality of their responses. Data will be anonymized, and informed consent will be obtained prior to participation. The study will ensure that participants' personal data, interview recordings, and survey responses are kept confidential and securely stored.

5. Results

This section presents the quantitative and qualitative findings of the study. The results are organized to address the three research questions concerning changes in speaking anxiety, speaking self-confidence, and willingness to communicate (WTC) following AI-mediated speaking practice. Quantitative results provide statistical evidence of these changes, while qualitative findings offer explanatory insights into learners' experiences and perceptions. Together, these results lay the empirical foundation for the mechanism-based discussion in the following section.

5.1. Quantitative Results

Quantitative data were collected through pre- and post-intervention questionnaires measuring speaking anxiety, self-confidence, and willingness to communicate (WTC). Paired-samples t-tests were conducted to examine changes before and after the four-week AI intervention.

5.1.1. Changes in Speaking Anxiety

This subsection examines whether AI-mediated speaking practice leads to a measurable reduction in learners' speaking anxiety. A paired-samples t-test reveals a statistically significant decrease in overall speaking anxiety after the four-week AI intervention. The mean anxiety score decreases from $M = 3.89$ ($SD = 0.56$) in the pre-test to $M = 3.02$ ($SD = 0.51$) in the post-test, $t(161) = 12.47$, $p < .001$.

Further analysis shows that items related to fear of negative evaluation exhibit the most substantial reduction among all anxiety components. Learner's report feeling less worried about making mistakes and being judged when engaging in speaking activities after AI practice. These results suggest that AI-mediated speaking environments may be particularly effective in alleviating socially driven aspects of speaking anxiety, which are further examined in the discussion section.

5.1.2. Changes in Speaking Self-confidence

This subsection explores changes in learners' speaking self-confidence following AI-mediated practice. The results indicate a significant increase in self-confidence from the pre-test to the post-test. The mean self-confidence score rises from $M = 3.21$ ($SD = 0.62$) to $M = 4.07$ ($SD = 0.55$), with the difference reaching statistical significance, $t(161) = -14.03$, $p < .001$.

Improvements are particularly evident in items related to pronunciation accuracy, fluency, and perceived speaking competence. These findings suggest that repeated AI-supported speaking practice and immediate feedback contribute to learners' growing confidence in their speaking ability. The role of confidence development is further interpreted in relation to affective and motivational theories in Section 6.

5.1.3. Changes in Willingness to Communicate (WTC)

This subsection examines whether gains developed through AI-mediated speaking practice transfer to learners' willingness to communicate in classroom contexts. The results show a significant increase in overall WTC after the intervention. The mean WTC score increases from $M = 3.05$ ($SD = 0.58$) to $M = 3.94$ ($SD = 0.60$), $t(161) = -11.86$, $p < .001$.

Notably, items related to classroom speaking situations, such as volunteering answers or participating in discussions, show greater improvement than those related to informal communication. This finding indicates that confidence developed in AI-mediated environments is not limited to private practice but can extend to socially exposed classroom interaction. The mechanisms underlying this transfer are discussed in Section 6.

5.2. Qualitative Results

The qualitative findings further illuminate how learners experienced AI-mediated speaking practice and help explain the quantitative changes observed above. Through thematic analysis of interview data, three recurring themes emerge, corresponding to the core mechanisms proposed in this study.

5.2.1. Non-judgmental Interaction and Reduced Fear of Evaluation

Participants consistently report that interacting with AI feels less stressful and emotionally safer than speaking in traditional classrooms. Many learners emphasize that they feel less embarrassed when making mistakes because the AI does not judge them or compare them with others. This perceived lack of social evaluation reduces anxiety and encourages learners to speak more freely.

These perceptions provide qualitative support for the quantitative finding that fear of negative evaluation shows the largest decrease, suggesting that the non-judgmental nature of AI interaction plays a central role in anxiety reduction.

5.2.2. Instant Feedback and Increased Confidence

Another prominent theme concerns the role of instant and precise feedback. Participants report that immediate correction helps them identify specific problems and feel more confident about their progress. Rather than feeling criticized, learners describe feedback as informative and supportive.

This theme helps explain the observed increase in speaking self-confidence in the quantitative results and highlights the importance of feedback clarity in shaping learners' emotional responses during speaking practice.

5.2.3. Controllable Pacing and Emotional Comfort

Learners also emphasize the value of controllable pacing in AI-mediated practice. The ability to pause, repeat, or practice without time pressure reduces emotional stress and allows learners to regulate their engagement according to personal comfort levels.

These experiences contribute to learners' sense of control and readiness to speak, providing further insight into how AI-mediated environments support affective stability during oral practice.

5.3. Summary of Results

In summary, the quantitative and qualitative results consistently demonstrate that AI-mediated speaking practice reduces speaking anxiety, enhances learners' self-confidence, and increases their willingness to communicate in classroom contexts. The convergence of statistical trends and learner-reported experiences provides a robust empirical basis for the mechanism-based discussion presented in the following section.

6. Discussion

6.1. Interpretation of Findings

The findings of this study provide valuable insights into how AI-powered speaking tools alleviate speaking anxiety among Chinese EFL learners. The data from both quantitative and qualitative analyses indicate that AI tools significantly reduce learners' speaking anxiety, enhance self-confidence, and increase their willingness to communicate in classroom settings. This study identifies three core mechanisms—non-judgmental interaction, instant feedback, and controllable pacing—that explain how AI tools reduce anxiety and promote oral communication.

Notably, the non-judgmental interaction provided by AI tools addresses learners' fear of negative evaluation, a key source of anxiety in traditional classroom settings. Additionally, instant feedback and controllable pacing help learners build self-confidence by giving them the opportunity to practice without time pressure or social evaluation. These results align with theoretical frameworks such as Krashen's Affective Filter Hypothesis and Face Theory, suggesting that AI-mediated speaking practice can function as an affective regulator in language learning.

6.1.1. Non-judgmental Nature of AI and Fear of Negative Evaluation

One of the major mechanisms identified in this study is the non-judgmental nature of AI interactions. Learners often report high levels of anxiety due to the fear of making mistakes in front of others (Horwitz et al., 1986). By offering a non-judgmental, private space for practice, AI tools reduce the social risks associated with speaking tasks. This finding supports the application of Brown and Levinson's (1987) Face Theory in language learning, where learners, especially in collectivist cultures like China, are highly sensitive to face-threatening situations. In the AI-mediated environment, learners can speak freely without the fear of peer or teacher evaluation, which leads to a decrease in anxiety and creates more opportunities for practice.

6.1.2. Instant and Precise Feedback and Self-confidence

Another critical mechanism is instant and precise feedback. The real-time corrections provided by AI tools have a significant impact on learners' self-confidence. When learners receive immediate feedback on their pronunciation, fluency, or grammar, it helps them understand their mistakes and feel more confident in their speaking abilities. This finding aligns with Krashen's Affective Filter Hypothesis (1982), which suggests that confidence-building reduces emotional barriers to language acquisition. Instant feedback enhances learners' self-efficacy (Bandura, 1997), making them feel

more capable and less anxious when participating in speaking tasks. By reinforcing correct language use, AI tools help learners build confidence incrementally.

6.1.3. Controllable Pacing and Self-efficacy

The third mechanism, controllable pacing, allows learners to practice at their own speed without the pressure of class schedules or time constraints. This feature is crucial for anxiety reduction, as it enables learners to repeat tasks, review mistakes, and adjust the pace of practice according to their individual comfort level. According to Bandura's (1997) Self-efficacy Theory, learners are more likely to engage in tasks when they believe they have control over the process. The ability to regulate practice pace enhances learners' sense of autonomy and contributes to their confidence, thereby reducing anxiety.

6.2. Deep Interpretation and Theoretical Dialogue

Building on the empirical findings reported in the Results section, this part provides a deeper interpretation of how AI-powered speaking tools alleviate speaking anxiety among Chinese EFL learners. Rather than treating AI effectiveness as a single outcome, this section organizes the discussion around three interrelated mechanisms and situates them in dialogue with established SLA and pragmatic theories. Together, these mechanisms illustrate how AI functions as an affective regulation system in speaking development.

6.2.1. Mechanism One: Non-judgmental Interaction and Face Theory

One central mechanism identified in this study is the non-judgmental nature of AI-mediated interaction. Quantitative results showed a significant reduction in learners' fear of negative evaluation, while interview data revealed that learners felt emotionally safer when speaking with AI than in traditional classroom settings.

This finding can be explained through Brown and Levinson's Face Theory, which posits that individuals are motivated to protect their positive and negative face during social interaction. In Chinese EFL classrooms, speaking English is often a face-threatening act, as errors are publicly observable and may lead to embarrassment or perceived loss of competence. As a result, learners frequently adopt avoidance strategies such as silence or minimal responses.

AI tools fundamentally alter this interactional context. Because AI does not evaluate learners socially, display impatience, or compare them with peers, the face-threatening dimension of speaking is substantially reduced. Learners can experiment with language, make mistakes, and self-correct without risking social embarrassment. In this sense, AI serves as a face-neutral interlocutor, lowering interpersonal pressure and allowing learners to engage more freely in oral production.

Importantly, this mechanism does not eliminate the importance of human interaction but rather prepares learners emotionally for it. By reducing face-related anxiety in private practice, AI helps learners build psychological readiness for public classroom speaking.

6.2.2. Mechanism Two: Instant Feedback and the Affective Filter Hypothesis

A second mechanism concerns the role of instant and precise feedback in reducing anxiety and supporting speaking development. The quantitative results showed a significant increase in learners' self-confidence, while qualitative data indicated that immediate correction helped learners feel more certain about their performance.

This mechanism aligns closely with Krashen's Affective Filter Hypothesis, which argues that emotional variables such as anxiety and self-confidence regulate how much linguistic input is processed for acquisition. When anxiety is high, the affective filter rises and blocks learning; when anxiety is reduced, the filter lowers and acquisition becomes more efficient.

In AI-mediated speaking practice, feedback is delivered in a low-pressure, non-evaluative manner, which differs from traditional corrective feedback in classrooms that may be delayed, selective, or socially exposed. Immediate feedback allows learners to notice errors at the moment of production,

reducing uncertainty and preventing the accumulation of anxiety caused by not knowing "whether one is speaking correctly."

From an affective perspective, this clarity lowers emotional tension and stabilizes learners' confidence. Thus, AI feedback does not merely function as a cognitive aid but also as an affective regulator, helping to keep the affective filter low during speaking practice.

6.2.3. Mechanism Three: Controllable Pacing and Self-efficacy Theory

The third mechanism identified in this study is controllable pacing, which enables learners to manage the timing, repetition, and intensity of speaking practice. Interview participants repeatedly emphasized the importance of being able to pause, repeat, or restart tasks without pressure.

This mechanism can be interpreted through Bandura's Self-efficacy Theory, which emphasizes that learners' beliefs about their ability to perform tasks strongly influence motivation and behavior. When learners feel a sense of control over the learning process, their perceived self-efficacy increases.

AI tools offer learners a level of autonomy rarely available in traditional classrooms, where speaking time is limited and turn-taking is externally regulated. By allowing learners to practice at their own pace, AI tools reduce time-related stress and foster a sense of mastery through repeated success. As self-efficacy increases, learners become more willing to attempt challenging speaking tasks and less fearful of failure.

This mechanism helps explain why confidence gains observed in AI practice were later reflected in increased willingness to speak in real classroom settings.

6.2.4. Dynamic Interaction Among Mechanisms: Toward an Integrated Model of AI-Mediated Affective Regulation

While the three mechanisms have been discussed separately for analytical clarity, the findings suggest that they operate in dynamic interaction rather than in isolation. Non-judgmental interaction reduces face-related anxiety, instant feedback provides emotional and cognitive reassurance, and controllable pacing enhances learners' sense of agency. Together, these mechanisms form an integrated affective regulation system.

From a dynamic perspective, reduced fear of negative evaluation creates emotional safety, which allows learners to attend to feedback without defensive anxiety. Clear feedback, in turn, strengthens self-efficacy, making learners more comfortable engaging in repeated practice. Increased self-efficacy further reduces anxiety, creating a positive feedback loop that gradually reshapes learners' emotional relationship with speaking.

This integrated model helps explain how confidence developed in AI-mediated environments can transfer to real classroom communication. Rather than replacing human interaction, AI functions as an affective scaffold, preparing learners emotionally and cognitively for socially complex speaking situations.

6.3. Theoretical Contributions and Implications

This study contributes to SLA theory by reconceptualizing AI-powered speaking tools as affective mediators rather than purely technological aids. It extends Krashen's Affective Filter Hypothesis to AI-mediated contexts, operationalizes Face Theory in technology-supported language learning, and demonstrates how self-efficacy mediates the relationship between anxiety reduction and willingness to communicate.

More broadly, the study supports the growing "affective turn" in SLA by showing that emotional regulation is not peripheral but central to speaking development, particularly in high-stakes EFL contexts.

6.4. Pedagogical Implications: Toward Human–AI Collaborative Teaching

The findings suggest that AI tools should be integrated into oral English instruction as complementary partners to human teachers, rather than as replacements. Teachers can assign AI-

based speaking practice as pre-class or after-class activities, allowing students to build confidence privately before participating in classroom interaction.

In-class time can then focus on communicative tasks, interaction, and feedback that require human judgment and social engagement. In this human–AI collaborative model, AI supports emotional regulation and rehearsal, while teachers facilitate meaning negotiation, pragmatic competence, and social interaction.

6.5. Limitations and Directions for Future Research

While this study provides valuable insights, several limitations should be noted. First, the sample was limited to university-level learners, which may affect the generalizability of the findings to younger or more advanced learners. Future research could examine how AI tools affect learners at various educational stages, such as high school or adult learners, to determine whether the mechanisms identified in this study apply across different age groups and proficiency levels.

Second, the intervention was relatively short (four weeks), and further research should explore the long-term effects of AI tools on learners' speaking anxiety, confidence, and speaking proficiency. Longitudinal studies would help assess whether the benefits of AI tools are sustained over time and whether they lead to permanent improvements in learners' speaking skills.

Additionally, future studies should investigate the role of individual differences, such as learners' baseline anxiety, personality traits, and learning styles, in moderating the effects of AI tools. By considering these individual factors, AI tools can be tailored to meet the diverse needs of learners and maximize their potential benefits.

7. Conclusion

7.1. Summary of Findings

This study aimed to investigate how AI-powered speaking tools alleviate speaking anxiety among Chinese EFL learners and identify the specific mechanisms through which this occurs. The results indicate that AI tools have a significant positive impact on reducing speaking anxiety, enhancing self-confidence, and increasing learners' willingness to engage in oral communication.

The study's findings highlight three key mechanisms through which AI tools alleviate anxiety: first, the non-judgmental nature of AI interactions reduces learners' fear of negative evaluation, a significant source of anxiety; second, instant and precise feedback from AI tools helps learners build confidence and overcome the fear of making mistakes; and third, controllable pacing allows learners to practice at their own speed, reducing emotional pressure and enhancing their confidence.

The combination of quantitative data from pre- and post-questionnaires and qualitative insights from interviews provided a comprehensive understanding of how AI tools affect learners' emotional and cognitive experiences during speaking practice.

7.2. Contribution to Theory

This study contributes to the field of second language acquisition (SLA) by extending Krashen's Affective Filter Hypothesis to AI-mediated speaking contexts. While Krashen's hypothesis has been widely applied to traditional language learning settings, this study demonstrates how AI tools, by reducing speaking anxiety, function as affective regulators that lower learners' affective filters, making them more receptive to language input.

Additionally, the study enhances the application of Brown and Levinson's Face Theory in the context of language learning. In Chinese EFL contexts, where learners are particularly sensitive to face-threatening situations, the non-judgmental interaction provided by AI tools alleviates anxiety related to fear of negative evaluation. This study demonstrates that AI tools can serve as an effective face-saving mechanism in language learning, which is especially critical in collectivist cultures.

Lastly, the findings support Willingness to Communicate (WTC) theory, showing that increased self-confidence, gained through AI-mediated practice, is positively correlated with greater

willingness to engage in real classroom speaking tasks. The study contributes to the theoretical understanding of confidence-building as a key component of language learning, highlighting its role in improving oral communication.

7.3. Practical Implications

The practical implications of this study are significant for language instructors and educational policymakers. First, the results suggest that AI-powered tools can be effectively integrated into English language classrooms to help reduce speaking anxiety. By offering learners a safe, non-judgmental space to practice speaking, AI tools enable students to gain confidence in their speaking abilities before engaging in high-pressure real-world communication.

For educators, this study underscores the importance of incorporating AI into the curriculum, especially for learners who experience high levels of anxiety or discomfort with speaking tasks. AI tools can provide a valuable supplement to traditional classroom instruction, offering individualized practice and feedback that fosters both linguistic and emotional growth.

Additionally, AI tools can be used as a supportive tool for introverted or anxious learners who may not have the opportunity to practice speaking in a low-risk environment in traditional classrooms. As AI tools allow for self-paced learning, they can accommodate learners at different levels of proficiency and anxiety, ensuring that all students have the opportunity to improve their oral communication skills.

7.4. Limitations and Future Research

Although the findings of this study are promising, there are several limitations that should be considered. First, the study only involved university-level learners, and its results may not be generalizable to younger learners or learners with different proficiency levels. Future research could explore the effects of AI tools on learners at various educational stages, such as high school students or adult learners, to determine whether the mechanisms identified in this study apply across different age groups and proficiency levels.

Second, the study focused on a short-term intervention of 4 weeks. While significant improvements were observed in learners' speaking anxiety and confidence, future studies should investigate the long-term effects of AI tool use on language learning. Longitudinal studies would provide valuable insights into whether the benefits of AI tools are sustained over time and whether they lead to permanent changes in learners' speaking proficiency.

Additionally, this study primarily relied on self-reported data from learners, which may be subject to biases such as social desirability or recall bias. Future research could include more objective measures, such as performance assessments or observational data, to further validate the findings and assess the impact of AI tools on actual language use in real-world contexts.

Lastly, future studies should examine the role of individual differences, such as learners' baseline levels of anxiety, personality traits, and learning styles, in moderating the effects of AI tools. It would be valuable to investigate whether certain types of learners benefit more from AI-mediated practice than others, and how AI tools can be tailored to meet the needs of different learner profiles.

7.5. Conclusion

In conclusion, this study provides empirical evidence that AI-powered speaking tools can effectively reduce speaking anxiety, enhance self-confidence, and increase learners' willingness to engage in oral communication. By addressing the emotional and psychological barriers to language learning, AI tools create a supportive and low-pressure environment for learners to practice speaking. The findings contribute to the theoretical understanding of how AI tools function as affective mediators and provide practical implications for integrating AI into language learning environments. Future research should continue to explore the long-term effects of AI tools and examine how individual differences shape the impact of AI on language learning.

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