

## Podcasting and L2 Listening: Impacts on Behavior and Attitude in Chinese Language Learners (播客与二语听力：对中文学习者行为和态度的影响)

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**Abstract:** This study explores the impact of pedagogical podcasts on second language (L2) listening behaviors and attitudes among Chinese language learners in a U.S. university context. Employing a quasi-experimental pretest-posttest design, 38 undergraduate students from intermediate and advanced Chinese classes engaged with a custom-designed podcast series over a 14-week semester. The intervention included both textbook-aligned recordings and authentic talk episodes, with weekly access provided via mobile platforms. Quantitative results indicated a significant increase in both the frequency and duration of listening practice outside the classroom, alongside a notable diversification of listening sources. Despite a slight but significant rise in perceived listening difficulty—likely attributable to increased metacognitive awareness—confidence levels remained stable, suggesting the development of cognitive resilience. Correlation analyses identified perceived difficulty as the strongest predictor of sustained podcast engagement, while confidence and perceived usefulness were less influential. Students attributed distinct benefits to the two podcast types: textbook recordings were seen as supportive of classroom learning, while authentic talks enriched vocabulary, facilitated practical comprehension, and enhanced learner engagement. Qualitative feedback highlighted a strong preference for supplementary scaffolding (e.g., vocabulary lists and transcripts), particularly for authentic content. These findings emphasize the value of podcasts as accessible, motivating tools for promoting autonomous listening practice and extensive exposure to the target language. The study concludes with pedagogical recommendations and calls for future research incorporating objective usage data, control group comparisons, and proficiency-specific podcast design to further optimize podcast-based L2 instruction.

**摘要：**本研究探讨了教学型播客对美国大学中文学习者在第二语言（L2）听力行为与态度方面的影响。采用准实验性的前测—后测设计，38名分别来自中级和高级中文课程的本科生在为期14周的学期中参与了本研究，并定期收听为其语言水平量身定制的播客系列。该干预包含课本配套录音与真实语料播客，每周通过移动设备平台发布。

量化结果显示，学生在课外听力练习的频率与时长均显著提升，听力材料来源也呈现出多样化趋势。尽管听力任务的感知难度略有上升——这可能源于元认知意识的增强——但学生的信心水平保持稳定，表明其在面对语言挑战时表现出认知韧性。相关性分析显示，感知难度是持续使用播客的最显著预测因素，而信心与感知实用性则影响较小。学生认为两类播客各有优势：课本音频有助于课堂学习，而真实谈话类播客则增强词汇掌握、实用理解能力及学习兴趣。质性反馈显示，学生普遍期望增加词汇表、文本稿等辅助材料，尤其是在面对真实语料时更为明显。研究结果强调了播客在提升学习动机、促进自主听力练习以及扩大语言输入方面的价值。文章最后提出教学建议，并呼吁未来研究引入客观使用数据、对照组设计及分级播客内容优化策略，以进一步提升播客在第二语言教学中的有效性。

**Keywords:** podcasts, L2 listening, Chinese language learning, learner behavior, attitudes, technology-enhanced language learning

**关键词:** 播客, 第二语言听力, 中文学习, 学习者行为, 态度, 技术辅助语言学习

## 1. Introduction

The importance of listening in foreign language acquisition is well established, yet students consistently receive insufficient practice both in and out of the classroom (Graham, 2006, 2016; Long, 1987; McCaughey, 2015). This discrepancy between the recognized significance of listening skills and the actual practice students engage in presents a persistent challenge in language education. A 2021 survey of over 100 college students enrolled in Chinese courses at Columbia University revealed that more than half had not listened to any Chinese audio materials in the past month, and 25% listened less than once per week. These findings, consistent with previous research (Goh, 2008; Karlin & Karlin, 2023), clearly illustrate a common challenge in foreign language acquisition: the lack of consistent listening input outside the classroom. Addressing this disconnect between the acknowledged importance of listening and students' limited engagement requires more accessible and motivating approaches to listening practice.

In recent years, podcasts have emerged as an innovative and increasingly popular tool in second language learning. Combining accessibility, flexibility, and engagement, podcasts offer a dynamic medium through which students can enhance their listening comprehension and sustain motivation (Abdous et al., 2012; Cai, 2022; Naidionova & Ponomarenko, 2018). The widespread adoption of smartphones and other portable technologies has further facilitated the integration of podcasts into educational contexts, enabling learners to access authentic audio content anytime and anywhere.

This study aims to explore the potential of podcasts to address the common challenge of limited listening practice in language education. Specifically, it examines their impact on students' motivation and perceptions of listening to Chinese-language materials. By evaluating the effectiveness of podcasts in enriching listening practices, the research seeks to contribute to the development of more engaging and effective language learning strategies and resources.

## **2. Literature Review**

### **2.1 The role of listening input in L2 learning**

Listening is fundamental to second language (L2) acquisition, serving as the primary channel through which learners are exposed to the target language (Goh & Vandergrift, 2022; Mohsen & Almudawis, 2021; Nunan, 2002; Vandergrift, 2004). A robust body of research has consistently demonstrated that both the quantity and quality of listening input significantly influence the development of L2 listening comprehension skills (Chang & Millett, 2013; Goh, 2008; Karlin & Karlin, 2023; Vandergrift, 1999).

Despite its recognized importance, listening remains one of the most demanding skills for L2 learners to master (Cai, 2022; Vandergrift, 2004). Several interrelated factors contribute to this challenge. The rapid pace of native speech often exceeds learners' processing abilities, hindering real-time comprehension (McBride, 2011). Pronunciation and intonation variations, whether individual speakers or regional dialects, can further complicate understanding (Cheng, 2018). Additionally, syntactic complexity and the frequent use of idiomatic expressions can overwhelm learners, particularly those with limited proficiency (Shang, 2008). These difficulties are compounded by the need to simultaneously decode sounds, recognize vocabulary, and interpret meaning, all of which place a considerable cognitive load on the listener. Such demands can erode learners' confidence, diminish motivation, and reduce their willingness to engage in further listening practice.

Moreover, a recurring theme in L2 research is that learners often receive inadequate exposure to the target language through listening activities (Khalili Sabet, 2012; Yin, 2015). Several factors contribute to this deficiency, including limited time for practice (Siegel, 2013), difficulty locating content matched to learners' proficiency levels (McCaughey, 2015), and a lack of structured support or pedagogical guidance for autonomous listening (Bozorgian, 2014). This gap in listening input poses a significant barrier to the development of effective comprehension skills.

### **2.2 Pedagogical applications of podcasts in L2 listening instruction**

Podcasting has increasingly been recognized as a valuable pedagogical tool for addressing the challenges inherent in L2 listening instruction. Unlike general-purpose podcasts, pedagogical podcasts are intentionally designed with language acquisition goals in mind. These resources often incorporate controlled vocabulary, modified speaking rates, and content aligned with learners' curricular needs (Rosell-Aguilar, 2013; Thorne & Payne,

2005). This distinction is significant, as research in educational technology emphasizes that the efficacy of digital tools lies not in the technology itself, but in how it is pedagogically integrated into instruction (Levy, 2009; Stockwell, 2012).

Empirical studies have consistently demonstrated the positive impact of well-designed podcasts on L2 listening development. For instance, O'Bryan and Hegelheimer (2007) integrated 14 instructor-created podcasts into an ESL listening strategies course at Iowa State University. The podcasts were specifically designed to complement classroom instruction by summarizing concepts, bridging between lessons, and introducing new material. The findings showed highly positive responses, with all six students listening to each podcast multiple times. The researchers demonstrated successful integration where podcasts became a normalized component of the curriculum. Cross (2014) conducted a 9-week case study with a Japanese EFL learner, teaching her to autonomously use BBC podcasts for listening development through metatextual skills and metacognitive instruction. The learner developed a structured 10-step listening approach and showed improvement in self-evaluation ratings from 50% to 93% comprehension. Through weekly guidance and journal keeping, she progressed from basic note-taking to sophisticated analysis including discourse construction and self-directed strategy development. The study demonstrated that learners can develop autonomous podcast exploitation skills with appropriate initial guidance.

In the context of Chinese language education, Yang (2014) conducted a comprehensive study examining the role of podcasts in enhancing listening comprehension. The 60-day intervention followed a structured three-phase design: selecting suitable audio materials, identifying key linguistic features (e.g., vocabulary and grammar), and implementing listening tasks alongside pre- and post-assessments. Results showed that consistent exposure to curated podcast episodes significantly improved learners' listening skills. Yang further proposed an instructional model for classroom integration, emphasizing content selection, strategy instruction, and promotion of autonomous listening outside class settings.

In summary, these findings underscore the pedagogical potential of podcasts when they are purposefully incorporated into language instruction. Their flexible, learner-centered design can support both structured classroom learning and self-directed practice, bridging a key gap in L2 listening input.

### **2.3 Impact of podcasts on listening: Behavior and attitude**

Beyond measurable gains in listening comprehension, podcasts have been shown to influence learners' affective and behavioral responses to L2 listening. Hasan and Hoon (2013), in a systematic review of podcast applications in language education, found that several studies reported positive shifts in learners' attitudes. These included reduced anxiety, greater willingness to engage with authentic audio content, and increased confidence in handling listening tasks. Such attitudinal changes are particularly important, as positive emotions and beliefs have been consistently linked to higher levels of engagement and persistence in language learning (Dörnyei & Ushioda, 2011).

A central psychological construct related to learner attitude is self-efficacy, defined as an individual's belief in their capacity to perform a specific task (Bandura, 1977). In the domain of L2 listening, Rahimi and Abedi (2014) examined the impact of regular podcast use among 60 EFL learners and found substantial improvements in listening self-efficacy scores. They attributed this enhancement to the autonomy that podcasts afford, allowing learners to regulate listening difficulty and revisit content as needed, thereby aligning input with personal proficiency and fostering a sense of control over learning.

However, the relationship between podcast use and self-efficacy is not uniformly linear. Pei et al. (2023) found that while podcast-based instruction led to improvements in listening performance, these gains did not consistently result in higher self-efficacy. This divergence underscores the complex, multifactorial nature of self-efficacy development and suggests that exposure alone may be insufficient. Explicit strategy instruction, timely feedback, and scaffolded practice may be essential to translate performance gains into stronger self-beliefs.

From a behavioral perspective, podcasts offer unparalleled flexibility, enabling learners to embed language exposure into daily routines via mobile devices. Yet, empirical research has not thoroughly investigated the behavioral patterns associated with sustained podcast use. Key questions remain regarding how the availability of podcasts influences the frequency and duration of listening sessions, the consistency of learner engagement over time, and the contextual factors that support long-term use of these resources.

Moreover, the attitudinal impact of podcast listening on learners' perceptions of L2 listening materials remains underexplored. It is unclear whether long-term podcast engagement alters students' perceptions of task difficulty, enhances their willingness to attempt more challenging content, or increases intrinsic motivation. Gaining insight into these psychological and behavioral dimensions is essential for optimizing podcast integration in language instruction.

To address these gaps, this study explores both the behavioral engagement and attitudinal shifts associated with pedagogical podcast use across varying proficiency levels. It seeks to answer the following research questions:

1. How do pedagogical podcasts impact students' time investment and frequency of listening practice outside the classroom?
2. How does the use of pedagogical podcasts influence students' listening confidence and their perception of listening difficulty over time?
3. What factors influence students' motivation to continue listening to podcasts?
4. How do students evaluate different types of podcast content, and what improvements do they suggest?

### 3. Methods

This study employed a quasi-experimental pretest-posttest design to investigate the impact of pedagogical podcasts on Chinese language learners. The mixed-methods

approach combined quantitative measures to assess changes in students' out-of-classroom listening behaviors (RQ1) and attitudes toward Chinese listening materials (RQ2), with qualitative data exploring students' willingness to continue using podcasts after the intervention (RQ3). Additionally, we gathered their suggestions for improvement (RQ4).

### 3.1 Participants

The study involved 38 undergraduate students enrolled in two Chinese language classes at a private research university on the East Coast. Participants ranged from 19 to 28 years old, with a mean age of 22. The gender distribution was 42% male and 58% female. The group comprised 47% White, 34% Asian, and 19% Hispanic students. Prior to the study, all participants completed an in-house Chinese placement test developed and administered by the university's Chinese program to assess language proficiency. Corresponding to the ACTFL proficiency scale, 21 students in the Advanced Chinese class were classified as Advanced Low, while 17 students in the Intermediate Chinese class were categorized as Intermediate High.

### 3.2 Procedure

During the first week of classes, the instructor led a discussion session on strategies for improving listening skills, during which students were introduced to a Chinese podcast series specifically developed for this study, and students were required to subscribe to the channel. Detailed information about the podcast content, structure, and accessibility is provided in the following section. Students were informed that participation in the study was entirely voluntary and unrelated to their course grades, and all students consented to participate. A pretest survey was conducted immediately following the discussion session, before engaging with the podcast series. This initial assessment documented their prior experience with Chinese audio materials and baseline perceptions regarding Chinese listening content.

Throughout the semester, participants received automatic notifications from the podcast platform when new podcast episodes became available, with no additional reminders from either the researchers or the instructors. The course instructors did not incorporate the podcasts into classroom activities or discussions, maintaining separation between the research intervention and regular coursework. At the end of the semester, participants completed a posttest survey that evaluated their current listening habits and gathered feedback on specific research areas of interest, including their experiences with different podcast content types and their willingness to continue using podcasts for language learning.

### 3.3 Podcast design

Students subscribed to podcast series created specifically for their Chinese course, receiving one or two episodes weekly. Two podcast series were developed to match the different proficiency levels of the classes: one for Intermediate Chinese and one for Advanced Chinese.

Each podcast series comprised two subcategories:

(a) **Textbook Audio:** Recordings of the main texts from the course textbook, providing students with supplementary listening practice of familiar content.

(b) **Real Talks:** Authentic narratives related to textbook themes but featuring natural speech patterns and authentic language use. These episodes were adapted from real-world sources such as online articles, business publications, and news reports, with content edited for appropriate length and complexity while maintaining authentic discourse characteristics. New word frequency was carefully maintained to ensure appropriate difficulty while remaining comprehensible (see Table 1 for details).

**Table 1 Key differences between the two podcast series**

Feature	Intermediate Level Podcast	Advanced Level Podcast
Textbook Audio Length	1-3 minutes	2-5 minutes
Real Talks Length	2-6 minutes	5-10 minutes
Speaking Speed	170-180 words per minute (wpm)	210-220 words per minute (wpm)
New Vocabulary Ratio	30-33 words per 1000	30-35 words per 1000

All podcast content was developed by a member of the research team who also served as the course instructor to ensure alignment between curriculum goals and appropriate difficulty calibration based on his knowledge of student abilities and needs. Topics were carefully selected to correspond with the chapter themes covered in each class (see Appendix 1 for sample topics). Over the 14-week semester, 21 episodes for each series were created and released. The podcasts were hosted on Spotify and Apple Podcasts, providing students with free and convenient access. New episodes were primarily released on Thursday nights, with automatic notifications sent directly to students' mobile devices.

### 3.4. Data collection

Data was gathered through pretest and posttest surveys administered via the Qualtrics platform. The surveys included a combination of Likert scale and open-ended questions (see Appendix 2 for key survey questions). To facilitate meaningful comparisons, certain questions were designed to be parallel across both surveys. The questions focused primarily on participants' actual Chinese audio listening practice and how they perceived the activity of listening to Chinese.

### 3.5 Measures

The study employed several measures to assess participants' engagement with Chinese audio materials, their attitude toward Chinese listening abilities. Moreover, participants were asked to provide specific feedback regarding the two podcast categories

(i.e., textbook audio recordings and authentic talk recordings), including their perceived usefulness and suggested improvement for these two kinds of Chinese podcasts. Lastly, participants self-reported their anticipated frequency of engagement with Chinese audio listening in the future as an indicator of continued motivation to engage with Chinese audio content.

### ***Engagement with Chinese audio materials***

**Listening frequency:** Participants reported their frequency of listening to Chinese audio materials on a 5-point scale. The scale ranged from 1 to 5 (1 = *never*, 2 = *once or twice a month*, 3 = *once or twice a week*, 4 = *three or four times a week*, and 5 = *five times a week or more*), reflecting different levels of engagement with the Chinese audio materials.

**Listening duration:** Participants reported their daily listening duration by choosing from a set of four options: *Fewer than 30 minutes*, *30 minutes to 1 hour*, *1 to 2 hours*, and *More than 2 hours*.

**Listening sources:** Participants were asked to specify the audio sources they used for Chinese listening materials apart from the podcasts. Options included *music*, *movies*, and *social media*, with the count of choices recorded.

**Attitude towards Chinese listening:** Perceived difficulty in Chinese audio materials: Participants assessed their perceived difficulty in listening to Chinese audio using a single item on a 5-point scale, where 1 = *very easy* and 5 = *very difficult*.

**Confidence:** Participants rated their confidence in Chinese listening ability on a 5-point Likert scale, where 1 = *not at all confident* and 5 = *very confident*.

### ***Attitudes towards two specific categories of Podcasts***

**Perceived Usefulness:** Participants rated the usefulness of two types of podcasts—textbook audio recordings and authentic talk recordings—on a 6-point scale, where 1 = *not useful at all* and 6 = *extremely useful*. Moreover, participants reported in what aspects the podcasts were useful in enhancing their listening ability.

**Suggestions for improvement:** Participants also offered specific suggestions for how to improve these two types of podcasts to enhance their effectiveness in assisting with Chinese listening.

### ***Motivation to continue listening to Chinese Audio materials***

Participants indicated their anticipated frequency of interaction with Chinese audio materials using the following options: 1 = *never*, 2 = *once or twice a month*, 3 = *once or twice a week*, 4 = *three or four times a week*, and 5 = *five times a week or more*.

## 4. Results

### 4.1 Listening practice frequency and duration

To answer RQ1, we investigated three dimensions of students' engagement with Chinese audio materials: frequency of listening, duration of listening sessions, and diversification of listening sources. To examine the effect of our podcast intervention on students' listening behaviors, we compared participants' responses at the beginning of the semester (pretest, before we launched the podcast intervention) and at the end of the semester (post the podcast intervention) using dependent t-tests.

#### *Listening frequency*

Analysis of listening frequency revealed a notable increase over the course of the semester. At the beginning of the study, participants reported an average listening frequency of 2.63 ( $SD = 1.15$ ) on the 5-point scale, indicating that most students were listening to Chinese audio materials between "once or twice a month" and "once or twice a week". By the semester's conclusion, this average had increased to 3.45 ( $SD = 1.01$ ), suggesting that students were now listening closer to "three or four times a week". To determine the significance of this change, a dependent t-test was conducted. The results showed a statistically significant difference between pretest and posttest reported frequencies,  $t(37) = 3.89$ ,  $p < .001$ . The magnitude of this difference was moderate, as indicated by Cohen's  $d = 0.49$ . This effect size suggests that the podcast intervention had a practically meaningful impact on students' listening habits, with participants engaging more frequently with Chinese audio materials by the end of the semester.

#### *Listening duration*

At the beginning of the study, before subscribing to the podcast channel, a substantial majority of participants (65.5%) reported spending fewer than 30 minutes daily on Chinese audio. This indicates that most students had limited engagement with Chinese listening materials prior to the intervention. The remaining participants were distributed as follows: 20.7% spent between 30 minutes to 1 hour, 3.4% listened for 1 to 2 hours, and 10.3% engaged for more than 2 hours daily.

By the end of the semester, after exposure to the podcast series, there was a notable redistribution of listening durations. The percentage of participants spending fewer than 30 minutes daily decreased to 55.2%, suggesting that some students had increased their listening time. Correspondingly, there was a substantial increase in the proportion of students listening for 30 minutes to 1 hour, rising from 20.7% to 34.5%. This shift indicates that a significant number of participants had moved from the shortest duration category to a moderate listening duration.

Interestingly, the percentage of participants listening for 1 to 2 hours remained constant at 3.4%, suggesting that the intervention did not impact this particular duration category. However, there was a slight decrease in the proportion of students listening for more than 2 hours daily, dropping from 10.3% to 6.9%.

### *Listening sources*

At the beginning of the semester, movies were the most popular additional listening resource, with 14 out of 33 students (42%) reporting their use (Figure 1). By the end of the semester, this number had increased to 22 students (72%), suggesting that students sought out more diverse and authentic Chinese language content along with increased exposure to the podcasts.

The popularity of Chinese songs as a listening resource increased notably over the course of the study. At the outset, 11 students (22%) reported using Chinese songs for language practice; by the posttest, this number had risen to 19 students (50%), reflecting a growing interest in musical content as a medium for developing listening skills.

Social media emerged as one of the most rapidly growing sources of Chinese listening input among participants. At the beginning of the semester, only six students reported using social media platforms for Chinese listening practice. By the end of the study, this figure had more than doubled to 16 students, suggesting an increased comfort with spontaneous, conversational Chinese as encountered in authentic digital contexts.

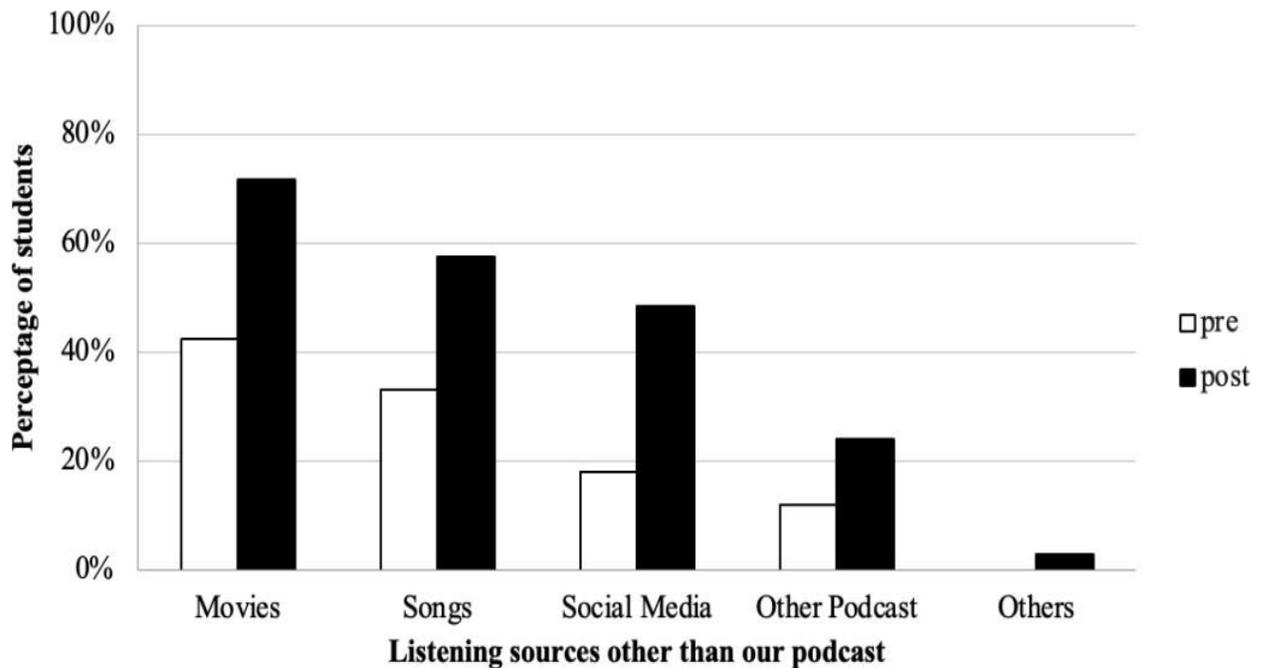


Figure 1 Listening resources in the pre- and posttest

Similarly, the use of external Chinese podcasts—those not included in the study’s intervention—also demonstrated notable growth. While only four students reported engaging with other Chinese podcast content at the outset, this number increased to eight by the posttest. This upward trend may indicate that structured exposure to the study’s pedagogical podcasts stimulated interest and confidence in independently exploring additional podcast-based resources.

Interestingly, while no students reported using other Chinese audio resources initially, one student reported listening to additional resources, such as TV shows, by the posttest. This indicates a slight diversification in listening sources beyond the categories explicitly measured.

To quantify the overall change in the diversity of listening sources, a dependent *t*-test was conducted. The results showed a significant increase in the average number of Chinese audio resources used by participants. In the pretest, participants reported using an average of 1.06 (*SD* = 0.75) other Chinese audio resources besides the study podcasts. By the posttest, this average had increased significantly to 2.06 (*SD* = 1.02) additional resources. The dependent *t*-test results ( $t(32) = 4.81, p < .001$ ) indicate that this increase was statistically significant. Furthermore, the large effect size (Cohen's *d* = 0.84) suggests that this change was not only statistically significant but also practically meaningful.

## 4.2 Changes in listening attitudes and perceptions

To answer this research question, we examined whether there is a change between the pretest and posttest in students' attitudes toward Chinese language listening along two dimensions: their perception of listening difficulty and their confidence levels when engaging with Chinese audio materials. We also analyzed the relationships between these attitudinal factors and students' listening behaviors over the course of intervention.

### *Perceived difficulty in listening to Chinese audio materials*

The study examined changes in participants' perceived difficulty of listening to Chinese audio materials over the course of the semester (Table 2). On a 5-point scale, where higher scores indicate greater perceived difficulty, the average score in the pretest was 3.07 (*SD* = 0.84). This initial score suggests that at the beginning of the semester, students perceived listening to Chinese audio as moderately difficult. By the end of the semester, after exposure to the podcast series, the average score for perceived difficulty increased to 3.38 (*SD* = 1.02). This increase indicates that, on average, students found listening to Chinese audio slightly more challenging by the end of the study period.

**Table 2 Pre- and post-intervention means and *t*-test results (N=38)**

Variable	Pretest		Posttest		Dependent <i>t</i> -test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	Cohen's <i>d</i>
Listening frequency	2.63	1.15	3.45	1.01	3.89***	0.63
Perceived difficulty	3.07	0.84	3.38	1.02	2.07*	0.39
Confidence level	2.72	0.84	2.83	0.85	0.90	0.20

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

To determine whether this change was statistically significant, a dependent *t*-test was conducted. The results showed a significant difference between pretest and posttest scores,  $t(28) = 2.07, p = .048$ . The effect size, as measured by Cohen's *d*, was 0.39, indicating a small to medium effect. This finding suggests that the increase in perceived difficulty, while statistically significant, represents a moderate practical change.

### *Confidence in listening to Chinese audio materials*

Confidence was rated on a 5-point scale, with higher scores indicating greater confidence. In the pretest, the average confidence score was 2.72 ( $SD = 0.84$ ), suggesting a moderate level of confidence at the beginning of the semester. By the posttest, this average had increased slightly to 2.83 ( $SD = 0.85$ ).

To assess whether this change in confidence was statistically significant, a dependent  $t$ -test (Table 2) was conducted. The results showed no significant difference between pretest and posttest scores,  $t(28) = 0.902$ ,  $p = .38$ . The effect size (Cohen's  $d = 0.17$ ) was small, indicating that any change in confidence levels was minimal from a practical standpoint.

### *Correlations among listening practice and perception factors*

To better understand the relationships between various aspects of Chinese listening practice and perceptions, correlation analyses were conducted. These analyses revealed interesting patterns both at the beginning and end of the semester (Table 3).

**Table 3 Correlations among Chinese listening behavior, Perceived difficulty, and confidence levels**

	Listening Frequency	Listening Duration	Perceived Difficulty	Confidence in Listening
Listening Frequency	--	.62*** ( $p < .001$ )	-.42** ( $p = .004$ )	.38** ( $p = .01$ )
Listening Duration	.63*** ( $p < .001$ )	--	-.44** ( $p = .006$ )	.58*** ( $p < .001$ )
Perceived Difficulty	-.80*** ( $p < .001$ )	-.58*** ( $p < .001$ )	--	-.68*** ( $p < .001$ )
Confidence in Listening	.49** ( $p = .004$ )	.25 ( $p = .16$ )	-.58** ( $p < .001$ )	--

*Note:* Pretest correlations are shown above the diagonal; posttest correlations are presented below the diagonal.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

In the pretest, both dimensions of students' listening behavior, frequency and duration, showed significant correlations with their attitudes: negative correlations with perceived difficulty ( $r = -.42$  and  $-.44$ , respectively) and positive correlations with confidence levels ( $r = .38$  and  $.58$ , respectively). This indicates that at the beginning of the semester, students who listened more frequently and for longer periods found Chinese audio less challenging and felt more confident in their listening abilities.

In the pretest, listening frequency showed moderate and significant correlations with several variables:

- A positive correlation with listening duration ( $r = .62$ ), suggesting that students who listened more frequently also tended to listen for longer periods.
- A positive correlation with confidence in listening ( $r = .38$ ), indicating that more frequent listeners tended to feel more confident in their listening abilities.
- A negative correlation with perceived difficulty ( $r = -.42$ ), suggesting that students who listened more frequently tended to perceive Chinese audio as less difficult.

Interestingly, these patterns were not only maintained but strengthened in the posttest correlations:

- The correlation between listening frequency and duration remained stable ( $r = .63$ ).
- The correlation between listening frequency and confidence increased ( $r = .49$ ), suggesting a stronger relationship between how often students listened and how confident they felt.
- The negative correlation between listening frequency and perceived difficulty became much stronger ( $r = -.80$ ), indicating that by the end of the semester, there was a very strong relationship between how often students listened and how difficult they perceived Chinese audio to be.

In the posttest, the correlations between listening behaviors and attitudes strengthened in several aspects. Listening frequency exhibited a substantially stronger negative correlation with perceived difficulty ( $r = -.80, p < .001$ ) and maintained its positive relationship with confidence ( $r = .49, p = .004$ ). For listening duration, the negative correlation with perceived difficulty increased ( $r = -.58, p < .001$ ), while its correlation with confidence became non-significant ( $r = .25, p = .16$ ). These patterns suggest that by the semester's end, students who listened more frequently and longer were much more likely to perceive Chinese listening as less difficult. However, the non-significant relationship between listening duration and confidence indicates that students' willingness to engage in extended listening sessions was independent of their perceived confidence in Chinese listening comprehension.

### 4.3 Factors influencing continued podcast engagement

To evaluate participants' willingness to continue engaging with Chinese listening materials, we analyzed students' answers to the predicted frequency of their future engagement with listening to Chinese audio materials, including podcasts. Results showed that a substantial portion (39.3%) predicted daily listening to Chinese audios, including podcasts, while six participants (21.4%) predicted to be engaged at least three times weekly. Nine participants (32.1%) predicted listening once or twice weekly, and a small minority (7.1%) did so once or twice monthly. These findings highlight participants' strong motivation and willingness to keep these listening habits and a tendency toward regular engagement among most participants, with daily or near-daily listening emerging as the most common practice.

When examining the factors that influence students' motivation to keep listening to podcasts, several key relationships emerge from the correlation analysis (Table 4). Results show a significant negative correlation between perceived difficulty and motivation ( $r = -.46, p = .015$ ). In other words, students who find listening activities more challenging tend to be less motivated to continue using podcasts for language learning.

**Table 4 Correlations among perceived difficulty, perceived usefulness, confidence level and continued motivation to listen to Chinese materials**

	Perceived Difficulty	Perceived Usefulness	Confidence Level	Continued Motivation
Perceived Difficulty	--	.15 ( $p = .407$ )	-.58** ( $p < .001$ )	-.46** ( $p = .015$ )
Perceived Usefulness		--	-.10 ( $p = .607$ )	.15 ( $p = .433$ )
Confidence Level			--	.36 ( $p = .061$ )
Continued Motivation				--

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

The relationship between confidence and motivation is approaching statistical significance ( $r = .36, p = .061$ ), suggesting a possible positive connection. While this correlation does not quite meet the conventional threshold for significance, the trend indicates that students who feel more confident in their listening skills may be more likely to continue using podcasts.

Surprisingly, the perceived usefulness of podcasts shows only a weak, non-significant correlation with future motivation ( $r = .15, p = .433$ ). One might assume that students who see podcasts as useful would be more inclined to keep listening, yet the data does not support this assumption. This suggests that perceived usefulness alone may not be enough to drive continued engagement, especially when difficulty perception appears to have a much stronger influence.

#### 4.4 Student evaluation of podcast content types and suggestions

The study compared two types of podcasts: textbook audio recordings and authentic talk recordings. For overall usefulness, students rated both types favorably. The authentic talks received a slightly higher mean rating ( $M = 4.61, SD = 0.91$ ) compared to the textbook audio ( $M = 4.17, SD = 1.64$ ). However, the dependent t-test results indicate that this difference was not statistically significant,  $t(37) = 1.26, p = 0.22$ , Cohen's  $d = 0.204$ . This suggests that students found both podcast types useful, albeit in different ways.

The qualitative analysis of student responses reveals distinct perceived benefits for each podcast type (see Table 5). Textbook audio recordings were primarily valued for

enhancing listening comprehension (10 mentions) and aiding class preparation (9 mentions), with additional benefits for pronunciation and tone (4 mentions). In contrast, authentic talks were appreciated for their contribution to vocabulary and expressions (6 mentions), practical and supplementary nature (6 mentions), listening comprehension (6 mentions), and engagement and interest (3 mentions).

This pattern suggests that students perceive textbook audio recordings as more directly supportive of coursework and foundational language skills, while authentic talks provide enrichment, real-world application, and greater engagement with the language. The complementary nature of these benefits indicates that a combination of both podcast types might best serve students' language learning needs.

**Table 5 Frequency of reported Chinese podcast learning benefits by types.**

<b>Category</b>	<b>Authentic Talks</b>	<b>Textbook Audio</b>
Listening Comprehension	6	10
Pronunciation & Tone	0	4
Fluency & Natural Speech	1	2
Vocabulary & Expressions	6	4
Engagement & Interest	3	0
Practical & Supplementary	6	0
Class Preparation	2	9

The data on students' suggestions for improvement provides valuable insights into how pedagogical podcasts could be enhanced to better serve language learners (see Table 6). A detailed quantitative analysis of these recommendations reveals several key themes, with a notable observation that students offered suggestions exclusively for the Authentic Talks series and not for the Textbook Audio series.

**Table 6 Student suggestions for improving the authentic talk series podcasts**

<b>Category</b>	<b>Frequency</b>
Supplementary Support	
Provide vocabulary lists	7
Provide transcripts	3
Content and Delivery	
Adjust difficulty level	3
Adjust speeding speed	2
Include more Episodes	1
Incorporate different voices	1
Instructional Integration	
Integrate podcast listening as course assignment	2

As shown in Table 6, the most common recommendation from students was the inclusion of supplementary materials, with vocabulary lists being the most frequently requested (7 mentions). Many students also expressed a desire for transcripts (3 mentions), indicating a strong preference for textual support alongside audio content. These requests

suggest that learners may struggle with unfamiliar vocabulary and complex structures in authentic talks and see supplementary materials as a way to reinforce their understanding and maximize learning outside of listening sessions.

In terms of adjustments to the podcasts themselves, students highlighted concerns about speaking speed (2 mentions) and difficulty level (3 mentions). These suggestions indicate that some learners found the content challenging, either due to its pace or complexity. Notably, the call for difficulty adjustments aligns with the correlation data, which shows that perceived difficulty significantly affects students' motivation to continue using podcasts for language learning.

Although less frequently mentioned, students also suggested incorporating different voices (1 mention) and increasing the number of episodes (1 mention). These recommendations reflect an interest in exposure to a wider range of speakers and expanded learning opportunities, underscoring students' awareness of the benefits of diverse linguistic input in language acquisition.

One particularly interesting recommendation was integrating podcasts into formal assignments (2 mentions). This suggests that some students believe structured use of podcasts in coursework could enhance their engagement and commitment to listening practice. From a pedagogical standpoint, this highlights the potential value of embedding podcasts into the curriculum to encourage consistent and meaningful use.

## **5. Discussion**

### **5.1 Impact of pedagogical podcasts on Chinese listening practice**

A key finding of this study is the marked increase in listening frequency among students who subscribed to pedagogical podcasts. The shift from an average frequency of 2.63 (between "once or twice a month" and "once or twice a week") to 3.45 (approaching "three or four times a week") highlights the potential of podcasts to foster more regular and sustained engagement with listening materials. This trend reflects the motivational and practical affordances of podcasts—namely, their accessibility, portability, and integration into daily routines. These findings echo McBride's (2009) study on Spanish language learners, which demonstrated that podcast availability significantly boosted the amount of time learners spent on listening practice.

Equally important is the observed redistribution in listening duration. Fewer students reported spending less than 30 minutes on daily listening, while a greater proportion engaged for 30 minutes to an hour. This increase in both frequency and duration suggest a meaningful expansion of learners' total listening exposure—an essential component for the development of listening proficiency, as supported by previous research (Chang & Millett, 2013; Goh, 2008).

In addition to quantitative improvements, a qualitative shift was also evident in the variety of listening sources students engaged with. The increased use of movies, music,

social media, and other non-course podcasts suggests that pedagogical podcasts serve not only as a primary resource but also as a catalyst for broader exploration of Chinese audio content. This behavioral change aligns with Siegel's (2011) advocacy for extensive listening, which emphasizes the pedagogical value of diverse and authentic listening materials in promoting listening fluency and adaptability.

Crucially, the data also revealed that students engaged with podcasts voluntarily, without institutional or curricular compulsion. This pattern points to the emergence of intrinsic motivation, an essential element in autonomous language learning. According to Ryan and Deci's (2000) self-determination theory, such self-motivated behaviors are often more enduring and impactful. The voluntary and repeated use of pedagogical podcasts thus indicates not only learner interest but also the capacity of well-designed content to stimulate meaningful, self-directed engagement with the target language.

In sum, these findings underscore the multifaceted benefits of pedagogical podcasts in enhancing both the quantity and quality of L2 Chinese listening practice. Their role in fostering autonomy, expanding exposure, and encouraging engagement with diverse materials positions them as a valuable asset in contemporary language learning environments.

## **5.2 Impact on perceptions of Chinese listening materials**

An intriguing and somewhat paradoxical finding of this study is the slight yet statistically significant increase in learners' perceived difficulty of Chinese listening tasks, despite regular exposure to pedagogical podcasts. At face value, one might expect that increased exposure would correspond with reduced perceived difficulty. However, this counterintuitive result aligns with well-documented patterns in metacognitive development within second language acquisition.

This phenomenon can be understood through the lens of flawed self-assessment, as described by Dunning, Heath, and Kruger (2004). In the early stages of skill acquisition, learners often overestimate their competence due to a limited grasp of the domain's complexity. As learners gain more experience, particularly through frequent engagement with authentic or semi-authentic materials, they are exposed to subtler linguistic features and structural complexities previously unnoticed. This heightened awareness fosters a more accurate, albeit sometimes harsher, self-appraisal of their listening ability. Thus, the increase in perceived difficulty may not reflect declining skill but rather a maturing understanding of the demands of L2 listening.

Importantly, while perceived difficulty rose, learners' self-reported confidence remained stable or showed slight improvement. This stability suggests a meaningful form of cognitive resilience. Rather than discouraging learners, the increased challenge appears to have been internalized as a natural part of the learning process. This finding is consistent with motivational theories emphasizing the importance of competence and self-efficacy in sustaining learner engagement (Dörnyei & Ushioda, 2011; Ryan & Deci, 2000).

The coexistence of increased perceived difficulty and stable confidence thus offers a promising insight: learners may become more metacognitively aware without losing motivation. Such a development suggests that pedagogical podcasts not only enhance linguistic exposure but may also foster a more sophisticated and realistic learner mindset—an outcome beneficial for long-term language development.

### 5.3 Continued use and influencing factors

The study's findings regarding learners' intentions to continue using podcasts for Chinese listening practice post-intervention are particularly promising. A notable 39.3% of participants reported plans to engage with podcast content daily, while an additional 21.4% indicated intentions to listen at least three times per week. These figures suggest that the podcast intervention not only enhanced short-term listening engagement but also cultivated sustainable listening habits for a substantial proportion of learners.

To understand the factors influencing continued podcast use, a correlation analysis was conducted. The results revealed that perceived difficulty emerged as the strongest and most significant predictor of continued motivation. Learners who perceived the listening tasks as more challenging were less likely to express their intentions to continue using podcasts. While the relationship between confidence and continued motivation approached statistical significance, perceived usefulness exhibited only a weak and non-significant correlation with learners' willingness to persist.

These findings underscore the pivotal role of difficulty perception in sustaining learner engagement with podcast materials. Among the variables examined, it is not the perceived utility of the content, but rather the learner's subjective experience of challenge, that most strongly determines ongoing motivation. This insight carries important pedagogical implications: careful calibration of difficulty levels may be more impactful for promoting long-term engagement than simply ensuring content relevance or usefulness.

This interpretation is well-aligned with Krashen's (1985) Input Hypothesis, which posits that optimal language acquisition occurs when learners are exposed to input that is just beyond their current level of competence—commonly referred to as “i+1.” If the input is too difficult (i+2 or beyond), learners may become frustrated or demotivated; if too easy, progress may stagnate. Thus, podcast content that consistently challenges learners at an appropriate level may not only enhance listening skills but also sustain motivation over time.

In summary, the study highlights the importance of balancing linguistic challenge with learner capacity in podcast-based instruction. Achieving this balance is essential for maximizing the motivational and pedagogical potential of podcasts in second language education.

### 5.4. Evaluation of podcast content types and suggestions for improvement

Students' evaluations of the two podcast types—textbook audio recordings and authentic talks—revealed a complementary relationship in terms of perceived usefulness.

While both formats were rated similarly for overall utility, qualitative feedback highlighted distinct pedagogical functions for each.

Textbook audio recordings were primarily valued for their role in reinforcing classroom learning. Students reported that these materials enhanced listening comprehension, supported class preparation, and improved pronunciation accuracy. These benefits underscore the importance of structured, level-appropriate input in consolidating linguistic foundations and aligning with formal instruction. As such, textbook-based content appears particularly effective in building core listening skills through repetition and review.

In contrast, authentic talks were praised for fostering vocabulary development, promoting practical language use, and increasing learner engagement. Students noted that this format exposed them to natural speech patterns, colloquial expressions, and culturally relevant topics—elements that enriched their learning experience and provided valuable real-world application. The engagement driven by authentic content also suggests an affective benefit, potentially increasing motivation and interest in the language.

Together, these findings support a complementary instructional model that integrates both controlled and authentic audio input. Textbook podcasts offer structure and alignment with curricular goals, while authentic talks provide challenge, enrichment, and exposure to diverse linguistic forms. The simultaneous use of both types appears to address a broader range of learner needs and learning styles.

Students also offered several suggestions for improving the podcast experience. Most notably, they requested additional scaffolding, such as vocabulary lists, transcripts, and glossaries. These supports are particularly important for authentic materials, which often include unpredictable vocabulary and fast-paced delivery. As Vandergrift and Tafaghodtari (2010) emphasize, strategic scaffolding significantly enhances comprehension and learning outcomes when engaging with challenging audio texts.

Furthermore, several participants recommended modifying the speed and difficulty level of the podcasts, reinforcing earlier findings that perceived difficulty strongly influences continued motivation. These suggestions align with established principles in input design, highlighting the importance of calibrating content to match learners' evolving proficiency levels in order to maintain optimal challenge and sustain engagement.

In summary, student evaluations affirm the pedagogical value of both podcast types, while also identifying key areas for enhancement. Implementing targeted scaffolding and differentiated content can maximize the instructional impact of podcasts and better support diverse learner profiles.

## **6. Conclusion and future directions**

This study contributes to the expanding literature on podcast integration in L2 listening instruction by examining its impact on Chinese language learners. The findings

demonstrate that pedagogical podcasts can substantially increase both the frequency and duration of out-of-class listening practice. Notably, many students also broadened their exposure by engaging with additional Chinese-language media, including films, songs, and social platforms, suggesting that podcast use can serve as a catalyst for extensive listening beyond the classroom.

Although exposure to podcast content was associated with a slight increase in perceived difficulty, learners' confidence levels remained stable, indicating that they were not discouraged by the added challenge. This combination of growing self-awareness and resilience highlights the developmental benefits of structured yet authentic listening input. However, the significant negative correlation between perceived difficulty and continued motivation reinforces the importance of carefully calibrating podcast content to learners' proficiency levels to maintain engagement over time.

Students identified distinct yet complementary benefits from the two podcast formats examined. Textbook audio recordings were seen as instrumental for supporting class preparation and reinforcing foundational skills, while authentic talks enhanced vocabulary acquisition, real-world application, and learner engagement. These findings suggest that a balanced approach—integrating both structured and authentic content—best supports diverse learner needs and promotes comprehensive listening development.

Several limitations merit consideration. First, the study relied on self-reported data, which may be subject to bias or inaccuracies. Future research should incorporate objective behavioral measures (e.g., app analytics or log data) to better capture listening patterns and engagement. Second, the sample focused on intermediate and advanced learners; further studies should explore how learners at varying proficiency levels respond to different podcast features, enabling more differentiated instructional design. Third, the use of objective listening comprehension assessments and inclusion of control groups would help strengthen causal interpretations and offer more robust evidence of podcast effectiveness.

In sum, this study underscores the pedagogical value of podcasts as an accessible and engaging tool for enhancing L2 listening practice. The findings offer practical implications for educators and curriculum designers and provide a foundation for future research aimed at optimizing podcast-based interventions across varied language learning contexts.

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## Appendix 1

### I. Samples of the podcast series topics

	Textbook Audio	Real Talks
Intermediate Level Podcast	初到公司 会见客户 中国人的称呼 握手的讲究 改革和开放 国企、私企和外企	王小鲁谈改革 民营企业 肯德基的中国化 龙行天下—开放的中国 外资撤离中国 数字广告
Advanced Level Podcast	肯德基全力打造中国人的快餐 可口可乐的中国功夫 必胜客：胜在起点 爱她就请她吃哈根达斯 耐克广告遭遇禁播	肯德基和麦当劳谁更胜一筹 美国中餐女王 云办公巨头 Zoom 跟着 Zara 去开店 不同于星巴克的蓝瓶咖啡 直播带货：崛起的新“风口”

### II. Sample of podcast transcripts

#### Textbook Audio 《改革开放》 Intermediate Level

从 1978 年到现在的几十年时间里，中国的经济取得了巨大的发展。中国的 GDP 年均增长 9.7%，经济总量的世界排名从第十位提高到第四位，外汇储备世界第一。随着经济的发展，中国人的生活水平也有了很大的提高。13 亿人的温饱问题已经基本上解决，农村的贫困人口从 1978 年的 2.5 亿减少到 2006 年的 2148 万。这些成绩都应该归功于

于邓小平提出的改革开放政策。

改革的重点是转变经济体制。改革以前，中国一直是计划经济，市场的作用很小。1978 年以后，中国政府决定向市场经济转变，建立“有中国特色的社会主义市场经济体制”。事实证明，30 年前开始的这次改革是成功的。它从农村到城市，从沿海到内地，调动了人们工作的积极性，使中国经济取得了巨大的发展。

中国对外开放，是为了融入世界经济。利用巨大的市场，中国吸引了大量外商和外资，他们对中国经济的发展帮助很大。中国也利用这个机会，向世界展示自己发展的成绩，改善自己的形象。现在，中国已经是很多发展中国家学习的典范。还有人说，中国是第三次全球化的主角。

#### Real Talks 《王小鲁谈改革》 Intermediate Level

今天的内容，取材于（中国改革基金会国民经济研究所副所长）王小鲁先生的讲话。原文比较长，今天我们先谈其中的两个问题。

第一个问题：这 40 年改革让中国经济发生了哪些变化？

王小鲁先生说, 1977年, 改革的前一年, 中国的人均GDP折算成美元是198美元; 2017年是8836美元。如果用人民币不变价/衡量的话, 人均GDP大概涨了30倍。用美元的不变价格衡量, 大概是15倍。

还有其他的一些数字也可以说明问题, 比如城镇化率, 1977年中国的城镇化率是17.5%, 也就是说, 80%以上的中国居民是农民, 当时农民的生活状况是很差的。2017年城镇化率58.5%, 农村居民下降到40%左右。所以, 总体上看, 改革让中国经济经历了翻天覆地的变化。

王小鲁先生认为, 这四十年, 主要有四个方面:

第一, 从过去的计划经济转向了市场经济。效率更高, 现在, 总体上看, 中国算是市场经济国家了。

第二, 从一个封闭的国家转向了开放。改革前, 中国对外贸易非常少, 既没有对外投资, 也没有外来投资。现在变成了一个总体上开放的经济, 中国目前已经是世界第一大贸易国了。

第三, 从过去的国有经济一统天下, 到现在实际上民营经济已经占了一大半了。

改革开放以前, 除了农业, 基本上都是国有经济, 在工业中, 国有企业占的比重接近80%, 剩下的20%全部是集体所有制企业。现在非国有经济占工业产出的比重已经超过了四分之三, 国有和国有控股企业占不到四分之一。

### Textbook Audio 《肯德基全力打造中国人的快餐》节选 Advanced Level

肯德基在中国已经走过了二十多个年头。回顾这二十多年的发展历史, 我们不难发现, 肯德基在中国的发展简直可以用“飞跃”两个字来形容。1987年11月12日, 肯德基落户北京, 北京肯德基有限公司也是当时北京第一家经营快餐的中外合资企业。从此, 肯德基在中国的扩张就一发而不可收。1992年10家, 1996年100家, 2004年1000家, 2007年2000家, 截至2009年2月, 肯德基在中国的餐厅数量达到2500多家, 创下国际快餐连锁业在中国开店数量之最。各种数据显示, 肯德基在中国已经取得了巨大的成功, 其发展速度和规模, 让它成为在华最成功的西式快餐连锁企业。

### Real Talks 《肯德基和麦当劳谁更胜一筹》Advanced Level

这两大“洋快餐”品牌, 在中国都拥有着不相上下的人气, 但是, 他们的策略和路线, 似乎又存在着很多不同。今天, 我们就对比一下, 看看他们到底谁更胜一筹?

第一、无差异 还是 差异化

麦当劳刚到中国, 就出现了“水土不服”的现状。这是因为在进入中国的最初几年, 麦当劳采取的是“无差异市场”的战略, 也就是将其在西方的经验直接搬到了中国的市场上, 比如在加油站附近开设门店, 这种做法虽然在美国为麦当劳带来了相当高的利润, 但在中国却根本行不通。同样, 在产品方面, 麦当劳以汉堡和牛肉为主, 这非常符合欧美消费者的饮食习惯, 但在中国却并没有那么受欢迎。

而肯德基则表现出了更强的适应能力，它针对不同的地域和饮食习惯，采用了差异化的市场战略，在以鸡肉为主的同时，推出了更符合中国人口味的汤、粥、饭等各种产品，并且不断地推出有地方特色的新品，比如老北京鸡肉卷、川香辣子鸡等等。

正因为两者在最初进入市场时，采取的战略不同，肯德基一直走在麦当劳的前面。后来，麦当劳也意识到了这一点，很快地调整了市场定位，做出了差异化的改变。

## Appendix 2

### Survey questions

#### Listening Frequency and Habits

1. In the past month, how many times in a week do you usually listen to our podcasts?
2. In the past month, how many times in a week have you listened to Chinese audio materials other than our podcast?
3. How do you usually listen to our podcast?

#### Podcast Usage Patterns

5. How many episodes of each subseries have you listened to?
  - Authentic talks
  - Textbook audios
6. For those episodes you have listened to, how many times do you usually listen?
  - Authentic talks
  - Textbook audios

#### Podcast Design Evaluation

7. What do you think of the speaking speed of the podcast?
8. What do you think of the timing of our weekly podcasts (i.e., released each Thursday)?
9. Please rate the length of each subseries:
  - Authentic talks
  - Textbook audios
10. Please rate the difficulty of each subseries:
  - Authentic talks
  - Textbook audios

#### Perceived Value and Impact

11. Overall, how useful are the podcasts to your Chinese learning?
12. Please rate the overall usefulness of each sub-series:
  - Authentic talks
  - Textbook audios

*Note: These questions represent key items from the pre- and post-intervention surveys administered to participants. Response options included Likert scales for agreement/evaluation questions and multiple-choice or open-ended responses for other items.*