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Analysis of Brand Plagiarism Using "Pepsi-Cola"

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Abstract

This study focuses on "Pepsi-Cola" and its plagiarized counterpart "B*ái* Shi Cola", analyzing trademark plagiarism from three dimensions: character graphics, phonetics, and pragmatics. In terms of character graphics, it compares the two brands' Chinese character structure, semantic differences (e.g., "Pepsi (B*ǎi* Shi)" meaning "all things" vs. "B*ái* Shi" meaning "funerals"), and visual similarity (confusable component "R*i*" in "B*ǎi*" and "Bái"). Phonetically, a high similarity in sound wave, duration (e.g., 4.829751 seconds for Beijing males), and formats was found from samples from Beijing/Shaanxi speakers via Praat software, with only minor pitch/end-of-sound differences. Pragmatically, similar characters/packaging can easily confuse low-literacy groups due to China's educational disparities. Linguistically and legally, "B*ái S*hi Cola" causes confusion, carries cultural offensiveness, and violates China's Trademark Law. Collectively, these findings support trademark infringement judgment and well-known brand protection.

Keywords

Character graphic analysis; Phonetic quantification (Praat); Pragmatic confusion; Trademark infringement; Trademark plagiarism

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1. Introduction

In the Spanish dictionary of the Royal Academy of Spain, plagiarism is defined as the act of "substantially copying another's work as one's own" [1]. [1]From a legal point of view, plagiarism is an infringement of the copyright of any type of artistic or intellectual work, which occurs when other people's works are presented as their own work or original work [2].

To explore the phenomenon of trademark plagiarism, the Chinese brand "Pepsi-Cola" (B*ǎi* Shi Cola) and its imitation (Bái Shi Cola) was chosen, as this case provides an illustrative example of how brand identity can be replicated or distorted through subtle linguistic and visual modifications. In this study, the two trademarks will be examined from three perspectives: graphic design, pronunciation and pragmatics.

2. Graphic analysis

2.1. Structural composition of the characters

In Chinese linguistics, characters are generally classified into two main categories: simple characters without

radicals and compound characters that contain radicals [3]. In the case of the trademarks "Bǎi Shi Cola" and "Bái Shi Cola", both consist of four characters, with the only distinction appearing in the first character. Structurally, the trademarks share a similar composition; each character functions as an independent unit rather than a combination of radicals.

The character "Bǎi" is ideographic in nature and can be conceptually divided into two ideograms, "Yī" (one) and "Bái" (white). This reflects a common phenomenon in imitation branding, where plagiarized trademarks replicate or slightly modify the ideographic features of the original [4].

In contrast, the character "Kě" contains a radical and exhibits a semi-enclosed structure. Specifically, the horizontal stroke "Yī" and the vertical hook partially surround the radical "Kǒu" (mouth), forming an integrated visual unit [5]. This structural composition demonstrates the complexity of Chinese character formation, which contributes to the nuanced visual similarities often exploited in trademark plagiarism.

2.2. Semantic and ideographic interpretation

Chinese is a very interesting and special language due to its writing, pronunciation and meaning isolated from each character. This feature allows for subtle yet significant differences in interpretation, particularly in the context of brand naming.

In the original trademark "B*ǎ*i Shi Cola", the character "B*ǎ*i" is composed of the ideograms "Yī" and "Bái". When combined, "B*ǎ*i" signifies "one hundred," symbolically representing abundance or completeness. The character "Shi" denotes "matter," "event," or "affair." Together, "B*ǎ*i Shi" metaphorically conveys "all things" or "everything." The final two characters, "Cola" (Kě Lè), combine "Kě", meaning "able to" or "can," and "Lè", meaning "happiness" or "joy." Thus, "B*ǎ*i Shi Cola" literally translates to "happiness in everything" or "everything can be joyful."

By contrast, the plagiarized version "Bái Shi Cola" replaces the first character "B*ǎ*i" (hundred) with "Bái" (white). While visually similar, the semantic shift is substantial. The compound "Bái Shi" in Chinese refers to funeral affairs or events associated with death, a phrase that carries distinctly negative connotations. When combined with "Cola", the resulting phrase ironically implies "finding joy in funerals" or "happiness in death," which is socially inappropriate and contextually absurd in Chinese culture [6]. This stark semantic contrast illustrates how minor graphical changes can lead to major pragmatic misinterpretations.

2.3. Visual similarity and perceptual confusion

From a visual perspective, the two trademarks "B*ǎ*i Shi Cola" and "Bái Shi Cola" are nearly identical, differing only in the first character. Both "B*ǎ*i" and "Bái" share similar strokes and contain the ideographic component "Rì" (sun) in their graphical structure. This close resemblance easily leads to perceptual confusion, especially for individuals unfamiliar with Chinese orthography or for consumers making quick visual judgments [8].

Such minimal variations are a common strategy in trademark plagiarism, exploiting the visual similarity between characters to mislead consumers while maintaining superficial distinctness for legal evasion. This phenomenon underscores the complexity of trademark protection in logographic writing systems like Chinese, where meaning, sound, and form are tightly interwoven, and where even slight visual alterations can carry profound linguistic and cultural implications.

3. Phonetic analysis

This section examines the phonetic characteristics of the original and plagiarized trademarks using acoustic analysis in Praat software. The analysis focuses on five primary dimensions:

(1) The waveform shape displayed by the Praat program;
(2) The pitch contour of each pronunciation;
(3) The terminal shape of the sound line;
(4) The overall duration of the utterance;
(5) The distribution of formant frequencies [9].

To ensure linguistic diversity and capture regional phonetic variation, speech samples were collected from four native Chinese speakers: one male and one female from Shaanxi Province, and one male and one female from Beijing. The Shaanxi dialect, originating from Xi'an, the ancient capital of thirteen Chinese dynasties,

retains deep historical and phonological significance within northern China. In contrast, the Beijing dialect, which closely aligns with Standard Mandarin, provides a contemporary benchmark for modern pronunciation.

By comparing these recordings, the study aims to identify how regional accents and tonal variations influence the phonetic realization of the two trademarks, "Bǎi Shi Cola" and "Bái Shi Cola", and to determine whether such variations affect listeners' perception of brand authenticity and distinctiveness [10].

3.1. Phonetic features of "Bǎi Shi Cola"

The phonetic features of the original trademark (Bǎi Shi Cola) were first examined using the speech sample produced by the female speaker from Beijing, whose pronunciation closely corresponds to Standard Mandarin norms.

From the acoustic analysis of the Beijing female speaker's sample, the Praat output reveals six distinct intervals along the pitch contour (blue line), with visible upper and lower boundaries corresponding to pitch variation across the syllables. The measured fundamental frequency (F_0) reaches a peak of approximately 343.26 Hz, while the final pitch falls to around 80 Hz, indicating a natural falling intonation at the end of the utterance. The total duration of the pronunciation is 3.18 seconds, demonstrating balanced timing and articulation across the four syllables. Regarding the formant structure, the first three formants were extracted to examine vowel quality and resonance characteristics [11]. The first formant (F_1) is measured at 813.19 Hz, the second formant (F_2) at 1730.82 Hz, and the third formant (F_3) at 2887.34 Hz. These values fall within the expected range for standard Mandarin vowel production, reflecting clear and stable articulation (**Figure 1**).

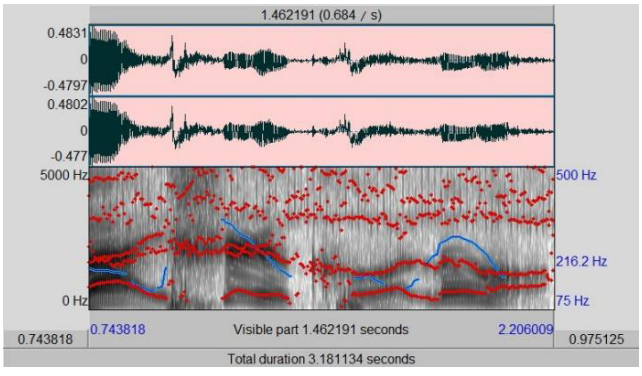

Figure 1. The phonetic analysis of Beijing female speaker.

Next, the Praat analysis of the Beijing male speaker's sample reveals six discernible intervals along the pitch contour, characterized by two prominent peaks and two lower troughs, indicating greater tonal fluctuation compared to the female speaker's recording. The F_0 reaches approximately 282.44 Hz, while the final pitch descends to around 300 Hz, suggesting a mild falling terminal intonation. The total duration of the utterance is 4.83 seconds, notably longer than the female sample, reflecting a slower and more deliberate speech tempo. Regarding the formant frequencies , the analysis identifies the F_1 at 1170.68 Hz, F_2 at 1745.31 Hz, and F_3 at 2618.29 Hz [12]. These values indicate slightly broader vowel resonance and lower harmonic concentration compared to the female sample, possibly due to physiological differences in vocal tract length and pitch range between male and female speakers (**Figure 2**).

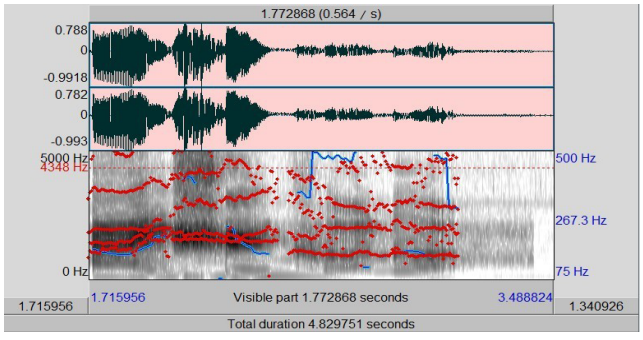

Figure 2. The phonetic analysis of Beijing male speaker.

The Praat analysis of the female speaker from Xi'an (Shaanxi dialect) reveals a distinctive pitch pattern compared to the Beijing samples. The initial segment of the pitch contour appears relatively flat, ranging from approximately 250 Hz to 240 Hz, indicating a stable onset with minimal tonal variation. This is followed by a brief pause and a subsequent sharp rise in pitch, succeeded by a gradual decline toward the end of the utterance. The average F_0 is measured at 249.54 Hz, while the final pitch drops to 0 Hz, signifying complete voicing cessation at the end of the phrase. The total duration of the pronunciation is 4.24 seconds, slightly shorter than that of the Beijing male speaker but longer than the Beijing female speaker's sample. In terms of formant frequencies, the F_1 registers at approximately 842.81 Hz, F_2 at 1770.05 Hz, and F_3 at 2955.34 Hz [13]. These values

are within the expected range for Mandarin vowels but show slightly higher resonance in the second and third formants, reflecting the regional characteristics of the Shaanxi dialect, which often features more pronounced vowel articulation and tonal breadth (**Figure 3**).

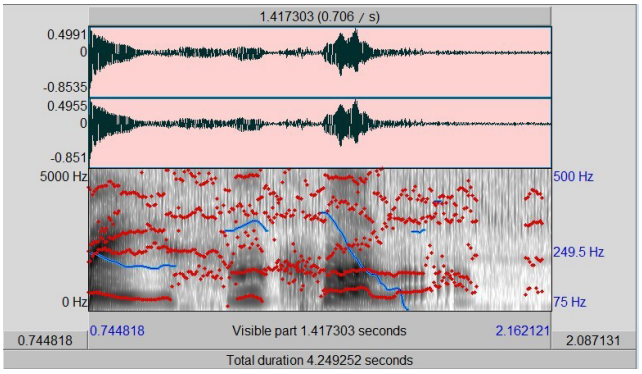

Figure 3. The phonetic analysis of Xi'an female speaker.

The Praat analysis of the male speaker from Xi'an (Shaanxi dialect) reveals a relatively compact pitch contour, with the highest point reaching approximately 450 Hz and the lowest point at 0 Hz, indicating a wide tonal range over a brief segment. The average F_0 is measured at 216.06 Hz, reflecting the naturally lower pitch typical of male speakers. The total duration of the utterance is 4.02 seconds, slightly shorter than the Xi'an female sample, suggesting a slightly faster articulation rate. The formant analysis includes the first four formants to capture more detailed resonance characteristics [14]. The F_1 is 1021.77 Hz, F_2 is 1716.02 Hz, F_3 is 2824.81 Hz, and F_4 is 4057.77 Hz. These values indicate a robust vocal resonance profile, with a broader distribution in higher formants compared to the female Xi'an sample, likely reflecting both physiological differences and dialectal articulation features (**Figure 4**).

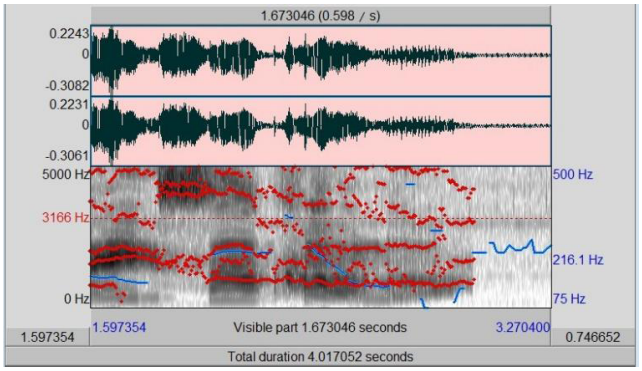

Figure 4. The phonetic analysis of Xi'an male speaker.

3.2. Phonetic features of "Bái Shi Cola"

The Praat analysis of the Beijing female speaker's pronunciation of the plagiarized trademark "Bái Shi Cola" reveals a pitch contour largely similar to that observed in the original brand, characterized by notable tonal volatility. The F_0 is approximately 230.97 Hz, with the terminal pitch descending slightly to 230 Hz, indicating a downward intonation at the end of the utterance. The total duration of the pronunciation is 3.72 seconds, slightly longer than the original sample. Regarding the formant structure, the F_1 is measured at 831.46 Hz, and F_2 at 1808.04 Hz, reflecting clear vowel articulation consistent with Standard Mandarin phonetic norms [15] (**Figure 5**).

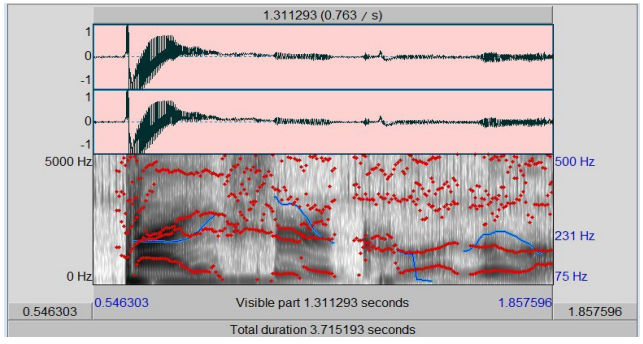

Figure 5. The phonetic analysis of Beijing female speaker.

The Praat analysis of the Beijing male speaker's pronunciation of the plagiarized trademark "Bái Shi Cola" provides insight into vowel distribution and pitch dynamics. In the spectrogram, regions of high intensity (black areas) correspond to vowels, while gray areas indicate the absence of vowels. Five distinct vowels are observable in this sample, separated by four intervening pauses. The pitch contour is composed of small, segmented lines, culminating in a rising terminal pitch of approximately 300 Hz. The average F_0 is 264.21 Hz, and the total duration of the utterance is 4.83 seconds, consistent with the original male sample. Regarding formant frequencies, the F_1 is 1171.32 Hz, and F_2 is 1712.64 Hz, reflecting typical vowel resonance for male Standard Mandarin speakers (**Figure 6**).

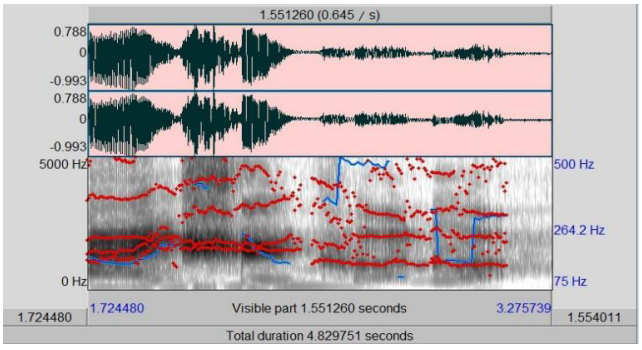

Figure 6. The phonetic analysis of Beijing male speaker.

The Praat analysis of the Xi'an female speaker's pronunciation of the plagiarized trademark was conducted across five acoustic parameters. The pitch contour appears as fragmented wave-like segments, initially rising and then falling. Analysis of the spectrogram indicates the presence of three vowels, with a noticeable interruption in the waveform corresponding to a brief pause. The average F_0 is 318.25 Hz, and the terminal pitch rises to approximately 470 Hz, indicating an upward intonation at the end of the utterance. The total duration of the pronunciation is 3.58 seconds. Regarding formant frequencies, the F_1 is 783.76 Hz, and the F_2 is 1790.82 Hz, reflecting typical vowel resonance patterns characteristic of the Xi'an dialect while maintaining intelligibility in Standard Mandarin (**Figure 7**).

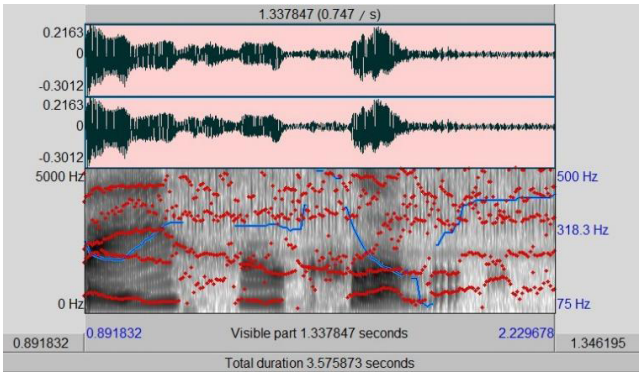

Figure 7. The phonetic analysis of Xi' an female speaker.

The Praat analysis of the Xi'an male speaker's pronunciation of the plagiarized trademark reveals a fragmented pitch contour with five discernible intervals. The shape of the pitch line exhibits alternating rises and falls, beginning with a downward movement, followed by an upward inflection, and repeating this pattern, ultimately ending with a rising terminal pitch of approximately 485.2 Hz. The average F_0 is 251.25 Hz, and the total duration of the utterance is 5.43 seconds, making it the longest among the four speakers analyzed. Regarding formant frequencies, F_1 is 1090.27 Hz, and F_2 is 1658.86 Hz, indicating robust vowel resonance with slight lowering compared to the female Xi'an speaker, consistent with male vocal characteristics (**Figure 8**).

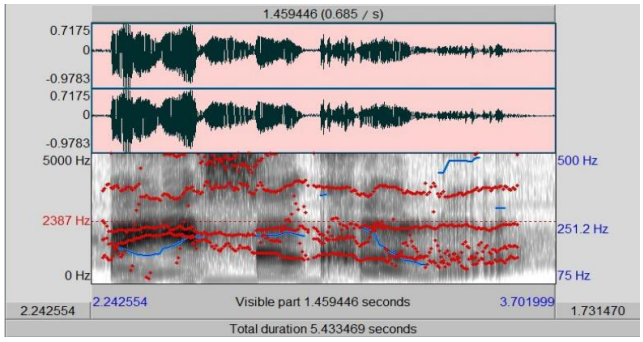

Figure 8. The phonetic analysis of Xi'an male speaker.

4. Pragmatic considerations in trademark perception

Given China's vast geographical and socio-economic diversity, pragmatic factors play a significant role in how consumers perceive and interpret trademarks. Differences in literacy, education, and exposure to mainstream media contribute to varying levels of brand recognition. In economically disadvantaged towns or rural areas, where literacy rates may be lower, consumers may struggle to distinguish between visually or graphically similar trademarks. In such contexts, even subtle variations in characters or imagery can lead to confusion and potential misidentification of products.

To illustrate this phenomenon, **Figure 9** presents a visual comparison of the original and plagiarized trademarks. The left image depicts the authentic Pepsi brand, while the right image shows the plagiarized version. Both the bottle shapes and overall graphical elements are nearly identical, highlighting how visual similarity can exacerbate pragmatic confusion among consumers who are less familiar with written characters or brand-specific features [16].

Figure 9. Comparison of the trademarks.

5. Conclusion

Based on the phonetic data collected, the pitch contours of each trademark exhibit notable similarity across speakers, with the lines generally appearing fragmented and wave-like. A comparison of the acoustic profiles reveals consistent shapes among all participants; however, gender-specific differences are apparent. For example, the Beijing male speaker consistently produces a deeper pitch compared to the other speakers. Additionally, there is a systematic difference in terminal pitch orientation, where in all cases, the original trademark "Bǎi Shi Cola" concludes at a lower pitch, whereas the plagiarized "Bái Shi Cola" concludes at a higher pitch. The durations of the utterances range approximately from 3 to 5 seconds. When comparing pronunciations of the same speaker across the two trademarks, the durations are nearly identical. For instance, the Beijing male speaker produced both trademarks with a duration of 4.83 seconds, whereas the Beijing female speaker produced "Bǎi Shi Cola" in 3.18 seconds and "Bái Shi Cola" in 3.72 seconds.

From a morphological perspective, all trademarks function as proper nouns in Chinese. In this language, proper nouns do not inflect for singular or plural forms, and their syntactic usage is limited to nominal reference; phrases or modifiers are typically not applied to trademark names. Despite structural similarities, the semantic divergence between the original and plagiarized brands is significant. The original "Bǎi Shi Cola" conveys the positive meaning of "all things can bring happiness," whereas the plagiarized "Bái Shi Cola" carries a morbid connotation, implying that "the death of people is a source of happiness." This semantic contrast underscores the importance of both phonetic and morphological analysis in understanding the perceptual and cultural impact of trademark plagiarism.

Disclosure statement

The author declares no conflict of interest.

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