Context Facilitation and Response Inhibition Effects in Chinese Ambiguous Word Disambiguation among Uyghur and Han University Students

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Abstract

Lexical ambiguity is a universal phenomenon in language. In Chinese, the wide variety of ambiguous words constitutes one of the major sources of difficulty for minority students learning Chinese. Through two experiments, we investigated the context facilitation effect and inhibition effect in ambiguous word resolution among Uyghur and Han university students under varying processing time conditions. The results indicated that both ethnic groups exhibited context facilitation effects; however, under short-time processing conditions, Han university students showed significantly greater context facilitation effects than Uyghur university students, whereas under long-time processing conditions, no significant difference emerged between the two groups. Under short-time processing conditions, only Han university students could effectively inhibit interference from irrelevant information, while under long-time processing conditions, both ethnic groups could effectively inhibit such interference. The overall findings demonstrate that in Chinese ambiguous word resolution, with increased processing time, both the context facilitation effect and inhibition of irrelevant information among Uyghur university students can reach levels comparable to those of Han university students.

Full Text

Contextual Facilitation and Inhibitory Effects in Chinese Lexical Ambiguity Resolution: A Comparison Between Uyghur and Han University Students

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Abstract

Lexical ambiguity is a universal phenomenon in language. In Chinese, the prevalence of ambiguous words poses significant challenges for minority students learning the language. This study investigated contextual facilitation and inhibitory effects in lexical ambiguity resolution among Uyghur and Han university students under different processing time conditions through two experiments. Both groups exhibited contextual facilitation effects. However, under short processing time conditions, Han students showed significantly stronger contextual facilitation than Uyghur students, whereas under long processing time conditions, no significant difference emerged between the two groups. Regarding inhibitory effects, only Han students could effectively suppress interference from irrelevant information under short processing time conditions, while both groups demonstrated effective suppression under long processing conditions. These findings indicate that with increased processing time, Uyghur students can achieve levels of contextual facilitation and irrelevant information suppression comparable to their Han counterparts in Chinese lexical ambiguity resolution.

Keywords: Uyghur nationality, lexical ambiguity resolution, contextual facilitation, response inhibition

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Lexical ambiguity is a fundamental linguistic phenomenon that manifests across lexical, syntactic, semantic, and pragmatic levels. In Chinese, lexical ambiguity is particularly pronounced, with numerous homophones, homographs, and heteronyms creating substantial difficulties for minority students. Accurate comprehension requires selecting appropriate meanings while suppressing inappropriate ones.

Research demonstrates that ambiguous word processing relies heavily on context (Shu et al., 2000; Zhou et al., 2003). Context—encompassing both linguistic and non-linguistic factors—facilitates processing of ambiguous sentences, producing what is known as the contextual facilitation effect. While psycholinguists have long debated whether this effect occurs pre-lexically or during post-recognition integration, studies across alphabetic and Chinese languages consistently confirm its existence (Gernsbacher et al., 1990; Ren et al., 2012, 2007; Sereno et al., 2003; Swaab et al., 2003; Zhang & Tang, 2011; Zhou et al., 2003).

Language comprehension involves not only activating target information but also suppressing irrelevant information. In lexical ambiguity resolution, appropriate meaning activation and inappropriate meaning inhibition occur simultaneously, making it difficult to distinguish these processes and their neural mechanisms. While most models focus on appropriate meaning activation, some researchers have attempted to differentiate these mechanisms. Zhou et

al. (2003) found that during early processing of homophonic ambiguous words, context primarily inhibits inappropriate meanings before subsequently facilitating appropriate ones. Norbury (2005) examined both contextual facilitation and inhibition effects in children with language impairments, autism with language impairment, autism with normal language, and typically developing children. The study revealed that children with language impairments showed poorer context utilization and higher error rates under inhibitory conditions. Gernsbacher and colleagues demonstrated that individuals with lower language proficiency exhibit deficits not only in activating and integrating relevant information but also in effectively suppressing irrelevant information (Gernsbacher & Faust, 1991; Gernsbacher et al., 1990). Thus, individuals with different language abilities vary in both context utilization and irrelevant information suppression.

To compare language comprehension differences across proficiency levels, researchers typically manipulate the interval between ambiguous words and target words. Gernsbacher et al. (1990) found that varying this interval did not affect contextual facilitation—both high- and low-comprehension individuals showed facilitation at short and long intervals. However, inhibitory effects differed only at longer intervals (750 ms). At short intervals (0 ms), all participants experienced interference from irrelevant meanings, but with increased time, high-comprehension individuals' interference dissipated while low-comprehension individuals continued to show disruption. Merrill et al. (1981) demonstrated that context-specific meaning selection was more likely at 1000 ms intervals than during immediate lexical access. Norbury (2005), using a 1000 ms interval, found that typically developing children were not disrupted by irrelevant meanings at long intervals, whereas children with language impairments showed interference effects. Since experiencing interference from irrelevant meanings presupposes activation of context-relevant meanings, contextual facilitation is a prerequisite for examining response inhibition.

In summary, research across alphabetic and Chinese languages consistently demonstrates contextual facilitation effects in lexical ambiguity resolution—faster processing of appropriate meanings in contextual versus non-contextual conditions. Moreover, individuals with different language abilities or linguistic backgrounds show varying inhibitory effects that change with processing time (Gernsbacher et al., 1990; Merrill et al., 1981; Yang et al., 2001, 2002). The inhibitory effect refers to the ability to suppress inappropriate meanings of ambiguous words and incorrect meanings of unambiguous words when contextually sensitive; otherwise, significant differences emerge.

Chang (1994) distinguished between linguistic and non-linguistic context. Non-linguistic context includes situational, cultural, and stylistic contexts. Linguistic context comprises language factors determining utterance form, such as co-text and discourse presuppositions. Cultural context encompasses the ideas, folk customs, and historical imprints of the communicative environment. Hall (1976) categorized cultures as high-context or low-context based on reliance on contextual information during communication. This distinction concerns the contrast

between implicit messages conveyed through context versus explicit messages conveyed through language. High-context cultures (e.g., China, Japan) feature indirect, 含蓄 expressions where contextual functions are prominent and listeners must infer most information from situations and cultural conventions. Low-context cultures (e.g., Britain, United States) feature direct, explicit expressions where language carries most information and context plays only an auxiliary role. Context cultures exist on a continuum without strict boundaries, and context utilization ability encompasses both linguistic and non-linguistic contexts.

Languages can be classified as inflectional, agglutinative, isolating, or polysynthetic based on morphological variation. English, French, and German are inflectional; Uyghur and Korean are agglutinative; Chinese is isolating. In agglutinative and inflectional languages, affixes attached to root morphemes convey grammatical meaning. For example, English shows derivational changes (“read” vs. “reader”) and inflectional changes (“reads,” “reading”). As an isolating language, Chinese lacks morphological variation—words have only one form without number, part-of-speech, case, or tense inflections. Accurate meaning determination depends entirely on context. Without context, Chinese characters or words cannot be definitively interpreted for meaning, grammatical properties, or even pronunciation. This linguistic characteristic shapes Chinese speakers’ holistic thinking patterns.

China is a multi-ethnic nation where many minorities possess their own languages and writing systems, which differ substantially from Chinese. National policy promotes proficiency in the common national language. Although minority students’ Chinese proficiency has improved through increased interethnic contact, many still struggle, particularly Uyghur students. These difficulties relate significantly to differences between native and common languages. Uyghur and Chinese belong to different language families with varying context dependence. From a linguistic context perspective, Uyghur (Altaic-Turkic) has rich affixes for word formation and inflection. Nouns have number, person, and case; verbs have voice, polarity, mood, tense, person, number, participles, gerunds, and converbs. Auxiliary verbs expressing various modalities are also well-developed. Since vocabulary itself conveys sufficient information, Uyghur relies less on context. Chinese (Sino-Tibetan) depends heavily on context for phonological, semantic, and grammatical determination. Without context, pronunciation cannot be determined (Yang et al., 2019), nor can meaning (Guli, 2018).

From a cultural context perspective, Uyghur communication emphasizes directness and clarity, with minimal hidden meanings or “implications,” relying primarily on explicit verbal expression rather than implicit understanding. Chinese communication, by contrast, emphasizes conciseness and implicit understanding, with substantial “implications” and greater reliance on “reading between the lines.” Thus, Uyghur is a low-context language embedded in low-context culture, while Chinese is a high-context language embedded in high-context cul-

ture. These differences in linguistic and cultural context undoubtedly affect processing styles and thinking patterns, leading to different abilities in utilizing linguistic and non-linguistic context during Chinese processing.

Research confirms Uyghur students' difficulties with Chinese. Zhang (2018) found that Uyghur students most need to improve Chinese grammar and vocabulary, with vocabulary being most challenging. Li (2013) noted that polysemy confuses foreign students. Liao (2014) observed that corresponding words in Uyghur and Chinese often have different semantic scopes, causing negative transfer during Chinese word processing. Students often rely on one-to-one translation, encountering increasing difficulties with polysemous words as exposure grows. The author argues that negative transfer involves not only semantic scope differences but also linguistic form and cultural disparities—critical factors affecting minority students' Chinese acquisition.

Cultural context influences Chinese word mastery in two ways: (1) The same concept may carry different cultural connotations (e.g., "magpie" symbolizes auspiciousness in Han culture but evil in Uyghur culture). (2) Vocabulary in specific cultural contexts involves background knowledge. Chinese ambiguous words inevitably contain Han cultural elements. Uyghur students'weaker context utilization creates processing differences.

In summary, Uyghur students' difficulties with the common national language may stem from weaker context utilization and poorer irrelevant information suppression. This study compares contextual facilitation and inhibitory effects between Uyghur and Han students to explore Uyghur students' ambiguity resolution processes and reveal reasons for their learning difficulties. Adapting Norbury' s (2005) cross-modal semantic consistency judgment task, this study uses visual presentation to ensure Uyghur students can fully read and comprehend sentences, minimizing reaction differences from listening or reading speed variations.

The experimental logic is as follows: Under contextual facilitation conditions, context-sensitive participants respond "yes" faster to biased sentences. Under inhibitory conditions, if participants are context-sensitive and can suppress irrelevant information, "no" response differences should be non-significant regardless of whether sentence-final words are ambiguous; otherwise, ambiguous sentences elicit slower responses, producing sentence type effects. To examine whether context effects occur pre-lexically or during post-recognition integration, different processing times were implemented, allowing investigation of how processing time affects ambiguity resolution differences between groups. Ihara et al. (2007) found significant activation in the left anterior inferior frontal gyrus 200 ms after ambiguous word presentation, suggesting multiple meanings were activated. Researchers propose that context-specific meaning selection occurs around 1000 ms (Faust & Gernsbacher, 1996; Merrill et al., 1981; Norbury, 2005). Since individuals with different language abilities may show different patterns across conditions, two experiments were conducted: Experiment 1 examined short processing time (200 ms), comparing contextual facilitation and inhibition between

groups; Experiment 2 examined long processing time (1000 ms), investigating how increased processing time modulates these effects.

Hypotheses predicted that: (1) Under contextual facilitation, Uyghur students would show weaker effects than Han students, with effects increasing as SOA lengthened; (2) Under inhibitory conditions, Han students would show non-significant sentence type effects, while Uyghur students would show significant effects that diminish with increased SOA.

Experiment 1: Short Processing Time Condition

Participants

Thirty-six Han university students (mean age = 20.75 years) and 32 Uyghur university students (mean age = 21.45 years), balanced for gender, were recruited from non-Chinese majors at a Beijing ethnic university. All Uyghur participants were proficient Chinese speakers who had passed the MHK Level 4 and Mandarin proficiency tests. They used Uyghur with peers but Chinese in other contexts, with normal or corrected-to-normal vision.

Design

The contextual facilitation condition employed a 2 (ethnicity: Han/Uyghur) × 2 (context type: neutral/biased) × 2 (semantic relative frequency: dominant/subordinate) mixed design, with ethnicity as a between-subjects factor and context type and semantic frequency as within-subjects factors. The inhibitory condition used a 2 (ethnicity) × 2 (semantic relative frequency) × 2 (sentence type: ambiguous/unambiguous) mixed design, with ethnicity as between-subjects and the other factors as within-subjects. Dependent variables were reaction time and error rate.

Materials

Forty-five homographic ambiguous words (primarily nouns) were selected from the *Modern Chinese Dictionary*, each being two-character words without polyphonic characters. Sixty Han university students not participating in the main experiment generated possible meanings. Based on a frequency difference index $> 50\%$ [(F1-F2)/F1], 25 ambiguous words were selected.

Sentences were constructed for dominant and subordinate meanings, with target words representing each meaning. Ambiguous words appeared at sentence endings, with preceding context providing clear semantic information. To ensure equivalent semantic relatedness, 33 additional Han students rated relatedness on a 7-point scale (dominant: 3.98 ± 0.33; subordinate: 4.07 ± 0.40; $t(32) = 1.70$, $p = 0.098$, n.s.). Thirty-eight other Han students rated meaning importance (dominant: 4.62 ± 0.35; subordinate: 4.20 ± 0.55; $t(37) = 7.27$, $p < 0.001$).

Twenty-five sentence sets were created, each containing 8 sentences (200 total). Sentences comprised 6–10 characters (mean = 8), divided into four presentation segments. One hundred sentences were used for each condition (see and). Stimuli were pseudo-randomized to prevent three consecutive trials from the same condition, three consecutive sentences with the same ambiguous word, or three consecutive same-key responses.

**** shows sample sentences and target words for the contextual facilitation condition. In biased sentences, only one meaning was appropriate; in neutral sentences, both meanings were plausible. Target words were always semantically consistent with sentence-final ambiguous words, requiring "yes" responses. Context-sensitive participants should respond faster and more accurately to biased sentences.

**** shows sample sentences for the inhibitory condition. Ambiguous and unambiguous sentence pairs differed only in the final word (a non-ambiguous replacement). Target words were semantically inconsistent with sentence-final words. If participants could suppress irrelevant meanings, rejection speed should be equivalent across sentence types; otherwise, ambiguous sentences would elicit slower responses.

Apparatus and Procedure

E-Prime 2.0 presented stimuli on a 17-inch IBM monitor (1024$×$768 resolution) in 72-point Song font. Participants sat approximately 60 cm from the screen, completing the experiment individually through self-paced reading. Each trial began with a 300 ms fixation cross, followed by a 300 ms blank screen. Sentences were presented word-by-word, with each new word replacing the previous one. After the sentence-final word disappeared, a target word appeared after 200 ms SOA for up to 3000 ms. Participants judged semantic consistency (F key for "yes," J key for "no"), with response hands counterbalanced. The intertrial interval was 1000 ms; responses exceeding 3000 ms triggered automatic advancement after 1000 ms. Eight practice trials preceded the experimental blocks. Response times and accuracy were recorded with $±$1 ms precision. Data were analyzed using SPSS 19.0.

Results and Analysis

Incorrect responses and RTs < 300 ms or > 2500 ms were excluded, along with data beyond M $\pm$ 2.5 SD (Han: 11.58% excluded; Uyghur: 13.94% excluded). Error rates were low (facilitation: Han = 0.71%, Uyghur = 0.98%; inhibition: Han = 0.31%, Uyghur = 0.68%) and not analyzed further. Results appear in and .

**** shows mean RTs for contextual facilitation. **** shows mean RTs for inhibitory conditions.

Contextual Facilitation Analysis ANOVA revealed significant main effects of ethnicity ($F_1(1,66) = 6.76$, $p = 0.012$, $^2 = 0.09$; $F_2(1,96) = 31.19$, $p < 0.001$, $^2 = 0.25$), with Han students (M = 799 ms) responding faster than Uyghur students (M = 906 ms), difference = 107 ms, 95% CI [24.87, 189.56]. Context type was significant ($F_1(1,66) = 60.57$, $p < 0.001$, $^2 = 0.48$; $F_2(1,96) = 69.84$, $p < 0.001$, $^2 = 0.42$), with slower responses to ambiguous (M = 895 ms) than unambiguous sentences (M = 810 ms), difference = 85 ms, 95% CI [63.01, 106.49]. Semantic relative frequency was significant by participants ($F_1(1,66) = 10.99$, $p = 0.001$, $^2 = 0.14$) but not items ($F_2(1,96) = 2.06$, $p = 0.154$), with faster responses to dominant (M = 836 ms) than subordinate meanings (M = 870 ms), difference = 34 ms, 95% CI [13.67, 55.04]. The ethnicity × context type interaction was marginally significant ($F_1(1,66) = 3.51$, $p = 0.06$, $^2 = 0.04$; $F_2(1,96) = 3.46$, $p = 0.066$, $^2 = 0.04$). Simple effects showed both groups responded slower to ambiguous sentences (Han: M = 851 ms vs. 747 ms, difference = 104 ms; Uyghur: M = 939 ms vs. 873 ms, difference = 66 ms; both ps < 0.001), with Han students showing stronger facilitation. Controlling for individual differences by dividing facilitation effects (ambiguous-unambiguous RT difference) by unambiguous RT (Ouyang & Zhang, in press) maintained the significant group difference, $t(66) = 2.18$, $p = 0.033$, Cohen' s d = 0.13. No other interactions were significant (ps > 0.05).

Inhibitory Effect Analysis ANOVA showed significant ethnicity effects ($F_1(1,66) = 23.52$, $p < 0.001$, $^2 = 0.26$; $F_2(1,96) = 116.18$, $p < 0.001$, $^2 = 0.56$), with Han students (M = 762 ms) faster than Uyghur students (M = 944 ms), difference = 182 ms, 95% CI [107.20, 257.23]. Sentence type was marginally significant by participants ($F_1(1,66) = 2.96$, $p = 0.09$, $^2 = 0.04$) but significant by items ($F_2(1,96) = 12.71$, $p < 0.001$, $^2 = 0.12$), with slower responses to ambiguous (M = 860 ms) than unambiguous sentences (M = 846 ms), difference = 14 ms, 95% CI [-2.20, 29.46]. Semantic relative frequency was marginally significant by participants ($F_1(1,66) = 3.86$, $p = 0.054$, $^2 = 0.06$) but not items ($F_2(1,96) = 2.30$, $p = 0.132$), with faster responses to dominant (M = 858 ms) than subordinate meanings (M = 874 ms), difference = 16 ms, 95% CI [-0.28, 34.97]. The sentence type × ethnicity interaction was significant by participants ($F_1(1,66) = 4.17$, $p = 0.045$, $^2 = 0.06$) but not items ($F_2(1,96) = 1.84$, $p = 0.18$, $^2 = 0.02$). Simple effects revealed no sentence type difference for Han students (M = 761 ms vs. 763 ms, $p = 0.78$), but Uyghur students responded slower to ambiguous sentences (M = 959 ms vs. 929 ms), difference = 30 ms, $p = 0.033$, 95% CI [2.53, 57.08]. Controlling for individual differences by dividing inhibition effects by unambiguous RT maintained the group difference, $t(66) = 2.07$, $p = 0.042$, Cohen' s d = 0.08. No other interactions were significant (ps > 0.05).

Discussion

Experiment 1 demonstrated that: (1) Both groups showed early contextual facilitation in Chinese ambiguous word processing, but Han students' effects

were stronger, indicating early context effects; (2) Han students effectively suppressed irrelevant information under short processing time, showing no sentence type effect, whereas Uyghur students could not, exhibiting significant sentence type effects. This suggests that for Han students, contextual facilitation and response inhibition operate simultaneously during early processing, while for Uyghur students, only facilitation occurs without effective inhibition in early stages, indicating different resolution mechanisms.

Experiment 2: Long Processing Time Condition

Participants

Identical to Experiment 1. Half completed Experiment 1 first, then Experiment 2; the other half reversed this order, with a 10-minute rest between sessions.

Design, Materials, and Apparatus

Identical to Experiment 1.

Procedure

Identical to Experiment 1 except that the SOA between sentence-final words and target words was 1000 ms.

Results and Analysis

Data trimming excluded incorrect responses and RTs < 300 ms or > 2500 ms, plus outliers beyond M $\pm$ 2.5 SD (Han: 11.16% excluded; Uyghur: 13.87% excluded). Error rates remained low (facilitation: Han = 0.72%, Uyghur = 0.99%; inhibition: Han = 0.26%, Uyghur = 0.60%) and were not analyzed. Results appear in and .

**** shows contextual facilitation RTs. **** shows inhibitory condition RTs.

Contextual Facilitation Analysis ANOVA revealed significant ethnicity effects ($F_1(1,66) = 9.42$, $p = 0.003$, $^2 = 0.13$; $F_2(1,96) = 51.45$, $p < 0.001$, $^2 = 0.35$), with Han students (M = 774 ms) faster than Uyghur students (M = 896 ms), difference = 122 ms, 95% CI [42.57, 201.06]. Context type was significant ($F_1(1,66) = 39.79$, $p < 0.001$, $^2 = 0.38$; $F_2(1,96) = 36.62$, $p < 0.001$, $^2 = 0.28$), with slower responses to ambiguous (M = 868 ms) than unambiguous sentences (M = 802 ms), difference = 66 ms, 95% CI [45.07, 86.83]. Semantic relative frequency was significant ($F_1(1,66) = 8.16$, $p = 0.006$, $^2 = 0.11$; $F_2(1,96) = 4.23$, $p = 0.042$, $^2 = 0.04$), with faster responses to dominant (M = 818 ms) than subordinate meanings (M = 853 ms), difference = 35 ms, 95% CI [10.59, 59.75]. No interactions were significant (ps > 0.05).

Inhibitory Effect Analysis ANOVA showed significant ethnicity effects ($F_1(1,66) = 14.71$, $p < 0.001$, $^2 = 0.18$; $F_2(1,96) = 123.02$, $p < 0.001$, $^2 = 0.56$), with Han students (M = 800 ms) faster than Uyghur students (M = 953 ms), difference = 153 ms, 95% CI [73.11, 231.85]. No other main effects or interactions were significant (ps > 0.05).

Discussion

Experiment 2 demonstrated that: (1) Under long processing time, both groups showed contextual facilitation without significant ethnicity differences; (2) Both groups effectively suppressed irrelevant information regardless of sentence-final ambiguity. Thus, processing time is a crucial factor modulating group differences in contextual facilitation and inhibition. With sufficient time, Uyghur students can utilize contextual information comparably to Han students.

General Discussion

Lexical ambiguity resolution requires activating and selecting appropriate meanings while suppressing inappropriate ones. This study reveals: (1) Han students effectively utilized contextual information and suppressed irrelevant information across both processing time conditions; (2) Uyghur students showed characteristic patterns—early contextual facilitation was present but weaker, reaching Han students' levels only with extended processing time; (3) Uyghur students' inhibitory effects were poor under short but comparable to Han students under long processing time.

Mechanisms of Chinese Lexical Ambiguity Resolution

Ambiguity resolution theories suggest different mechanisms across groups. For Han students, context effects emerged early, simultaneously facilitating appropriate meanings and inhibiting inappropriate ones. This supports selective access models where context guides appropriate meaning access, allowing only context-consistent meanings to reach consciousness despite initial multiple activation (Zhang & Shu, 2000). For Uyghur students, early context effects facilitated appropriate meanings without effectively inhibiting inappropriate ones, which were suppressed later. This pattern does not clearly support any single theory: early context effects align with selective access and reordered access models, but these posit simultaneous multiple meaning access, inconsistent with our findings. The delayed inhibition pattern partially aligns with multiple access models, but those place context effects post-lexically, also inconsistent. Thus, Uyghur students' resolution mechanism appears distinct.

Contextual Facilitation and Inhibition in Native Chinese Speakers

Han students showed early contextual facilitation (200 ms) with simultaneous effective inhibition, regardless of meaning dominance. This differs from Zhou and Chen (2003), who found early inhibition for inappropriate subordinate meanings

of homophonic but not homographic ambiguous words. Our self-paced reading task required using context to reject inconsistent target words, whereas Zhou and Chen' s design confounded semantic unrelatedness and inconsistency. Our findings indicate that native Chinese speakers can rapidly process appropriate meanings while suppressing inappropriate ones during early ambiguity resolution, with facilitation and inhibition operating concurrently.

Contextual Facilitation and Inhibition in Uyghur Students

Uyghur students showed contextual facilitation across both time conditions but failed to suppress irrelevant information under short processing time. This indicates reduced context sensitivity, with suppression emerging only after 1000 ms. Facilitation and inhibition occurred sequentially: first activating context-relevant meanings, then suppressing irrelevant ones. These differences likely relate to language proficiency, native language characteristics, and thinking styles.

Ethnic Differences in Contextual Facilitation The weaker early facilitation for Uyghur students aligns with Yang et al. (2019), who attributed this to second language proficiency, native language features, and processing style. Bilinguals process second languages using native language neural networks (Mei et al., 2017), with proficiency modulating this interaction (Gao et al., 2015; Marian et al., 2007). When proficiency is high, processing becomes more automatic and native-like (Briellmann et al., 2004). However, native language influence persists. According to assimilation-accommodation theory, second language processing involves both languages'features. Cao et al. (2013) found that proficiency modulates native network involvement, especially when orthographic depth differs. Uyghur' s shallow orthography (transparent grapheme-phoneme correspondence) leads Uyghur speakers to focus on word form when processing Chinese' s deep orthography, reducing attention to contextual information and weakening facilitation effects.

The convergence of facilitation effects under long processing time resulted not from Uyghur students' improvement but from Han students' reduced effect. Han students' RTs for unambiguous sentences differed minimally across conditions (short: 747 ms; long: 737 ms), while ambiguous sentence RTs showed greater reduction (short: 851 ms; long: 813 ms). Thus, extended processing allowed Han students to more efficiently integrate context-consistent meanings while suppressing irrelevant ones, suggesting that with sufficient time, Uyghur students can similarly utilize context effectively.

Ethnic Differences in Inhibitory Effects Uyghur students showed sentence type effects only under short processing time, indicating difficulty rapidly suppressing activated irrelevant meanings despite awareness of multiple meanings. This reflects poorer context utilization, stemming from linguistic and thinking style differences. Chinese (isolating) and Uyghur (agglutinative) differences reflect distinct thinking patterns: Chinese emphasizes parataxis and

semantic coherence, fostering holistic, imagistic, and fuzzy thinking; Uyghur emphasizes morphological variation and grammatical precision, fostering logical, abstract, and exact thinking (Chen & Chen, 2012; He, 2001; Shen, 2017; Xu, 2016). Consequently, Han students excel at using context to activate appropriate meanings while suppressing inappropriate ones. Uyghur students activate multiple meanings but cannot quickly suppress inappropriate ones using context.

Group differences also relate to native language context dependence. As native speakers of a high-context language, Han students are more context-sensitive, facilitating appropriate activation and inappropriate inhibition. Uyghur students, native speakers of a low-context language, process Chinese with reduced context sensitivity. During early processing, multiple semantic activations produce facilitation but poor inhibition, with effective suppression emerging only during later integration stages under long intervals.

Implications and Future Directions

For proficient Uyghur-Chinese bilinguals, long processing time eliminates group differences, with disparities emerging only under short intervals. Since oral comprehension requires immediate online processing of linear, non-repeatable speech signals, it poses greater challenges for second language learners (Gisladottir et al., 2018; Yao, 2007). Even proficient Uyghur students differed from native speakers under short processing time, suggesting beginners would face greater difficulties. Surveys of Xinjiang' s basic education show students prioritize character and vocabulary learning through teacher explanation (Wang, 2020), highlighting the importance of oral instruction.

These findings have important pedagogical implications: (1) In auditory comprehension-focused instruction, teachers should reduce speech rate and slow pacing to provide Uyghur students with longer integration time. Speech-to-text AI tools could provide visual support to enhance contextual processing. (2) Since Uyghur students show weaker context utilization and sequential processing (facilitation before inhibition), instruction on polyphonic and polysemous words should embed each pronunciation/meaning in consistent contexts rather than presenting multiple options simultaneously.

Beyond polysemy, Chinese idioms, metaphors, and euphemisms also require contextual processing and may challenge minority students. Future research should examine how minority students process figurative language. Additionally, since Chinese is Uyghur students' second language, findings cannot generalize to Uyghur ambiguity processing. How Uyghur students process ambiguity in their native language warrants investigation. Finally, Chinese proficiency significantly affects ambiguity resolution; future studies should examine Uyghur students across proficiency levels to track processing mechanism development.

Conclusions

This study reveals that: (1) Both Han and Uyghur university students show significant contextual facilitation in Chinese lexical ambiguity resolution, with stronger effects in Han students; (2) Han students effectively suppress inappropriate meanings across processing times, whereas Uyghur students do so only under long processing time; (3) Groups differ in context utilization patterns: Han students show simultaneous facilitation and inhibition, while Uyghur students show sequential processing—first facilitating appropriate meanings, then inhibiting inappropriate ones.

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Note: Figure translations are in progress. See original paper for figures.