Proceedings of the 6th International Conference on Educational Innovation and Psychological Insights
DOI: 10.54254/2753-7048/2025.ND34309

Lexical Attrition in Adult Bilinguals: Unpacking the Role of Code-Switching

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Abstract. This paper intends to look into the relationship between first language (L1) lexical attrition and code-switching behavior among adult Chinese-English bilinguals, and based on the Activation Threshold Hypothesis, the study regards attrition as a retrieval-based matter, in which the lexical items that are not used often become less easy to access because of the raised activation thresholds, and although code - switching is usually considered as a socio-pragmatic strategy, we suppose that the frequent, unconscious intra-sentential switches, especially at the lexical level, might act as real-time behavioral signs of the retrieval difficulty related to attrition. The study plans to adopt a comparative design among bilingual groups with different degrees of L1 use and combine the self-reported language background data (collected through the LEAP-Q) with production tasks such as picture-naming and spontaneous narrative elicitation, and the code-switching patterns will be analyzed by using a modified version of Poplack's lexical category framework. This project aims to improve the theoretical connections between lexical access and bilingual language behavior, providing a usage-based way to find the early signs of lexical attrition, and in the end, the study tries to contribute to the broader models of bilingual language processing and maintenance by reinterpreting code-switching as a reflection of adaptive linguistic regulation under the changing access conditions.

Keywords: L1 attrition, code-switching, activation threshold, lexical retrieval, bilingualism

1. Introduction

Adult bilinguals in environments where the second language (L2) is dominant often have trouble accessing lexical items in their first language (L1), a situation known as lexical attrition [1], and importantly, attrition is more and more seen as a failure in accessibility rather than a permanent loss. In this case, L1 lexicons that are not used frequently need a higher level of activation for retrieval [2]. At the same time, these individuals usually show unconscious code-switching (CS) within sentences, especially when it comes to core lexical categories like nouns or verbs. Although CS has been traditionally studied as a sociolinguistic strategy, psycho-linguistic evidence shows that detailed, unintentional switching might indicate problems with L1 retrieval. Previous work supports this connection: Darko [3] discovered that Twi-English bilinguals unconsciously switched to English

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DOI: 10.54254/2753-7048/2025.ND34309

nouns or verbs when there were gaps in the lexicon, which is in line with the prediction of the Activation Threshold Hypothesis (ATH) that content words, which are most likely to be affected by attrition, lead to CS. In the same way, Gallo et al. [4] demonstrated that CS in core grammatical elements (such as the lexicon or morphology) is related to difficulty in retrieving L1, and Poplack's [5] typology suggests that switches within sentences at the lexical level (for example, substituting a single noun) are more likely to be associated with processing difficulties than with managing discourse. These results imply that CS might be an "externalization" of the internal attrition processes; that is, L2 lexicons are used when L1 activation fails.

This study connects existing perspectives and proposes that increased the activation thresholds of L1 lexical items causes speakers to unconsciously code-switch. The study aims to examine this hypothesized causal link between L1 attrition and the specificity of code-switching patterns through spontaneous narrative tasks and detailed syntactic categorization [5]. By comparing Mandarin-English bilinguals across varying levels of L2 immersion, we seek to determine whether code-switching can serve as an implicit behavioral marker of L1 lexical attrition.

2. Literature review and theoretical framework

2.1. Lexical attrition in bilinguals as accessibility rather than loss

In current research on language attrition, lexical loss is increasingly conceptualized as a matter of reduced accessibility rather than irreversible forgetting. According to the Activation Threshold Hypothesis (ATH), originally proposed by Paradis and cited in Köpke and Genevska-Hanke [2], lexical items that are infrequently used become harder to access due to elevated activation thresholds. This framework characterizes attrition as a dynamic and potentially reversible process, whereby exposure to input can reactivate weakened lexical representations. Empirical findings lend support to this perspective: delayed picture-naming [4], increased hesitation and self-repair [6], reduced lexical diversity [7], and more frequent reports of tip-of-the-tongue (ToT) phenomenon [8] have all been documented as indicators of diminished lexical accessibility.

In addition to these behavioral manifestations, studies based on comprehension provide converging proof; for instance, Linck et al. [9] discover that native English speakers immersed in a Spanish-speaking environment are less responsive to lexical distractors from their first language during translation recognition, indicating that the automatic activation of the native vocabulary is subdued in the second-language context. Although our study centers on a productive task (particularly, lexical diversity) rather than comprehension, such findings emphasize that retrieval difficulty, not loss of representation, is a main characteristic of lexical attrition, especially when there is continuous immersion in the second language.

Although length of residence (LoR) in L2-immersion environment is often used as an indicator of attrition severity, multiple researches have proven its inconsistency in prediction. Schmid et al. [10] argue that attrition may follow non-linear patterns and may be shaped by various individual and contextual factors. Therefore, it would be quite reasonable and necessary to resort to observable linguistic behaviors, such as lexical choice and code-switching frequency, rather than relying exclusively on demographic proxies.

2.2. Code-switching as a behavioral symptom of lexical attrition

Although code-switching is regarded as an indication of bilingual dexterity, certain switching actions may show difficulties in lexical retrieval instead of being a matter of stylistic preference.

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Darko [3] in particular notices that Twi-English bilinguals often carry out unplanned, within-sentence code-switching, especially when trying to remember nouns and verbs. According to the Activation Threshold Hypothesis, these are the types of words that are more likely to experience lexical weakening, and these unplanned insertions from English, which is usually the more dominant language, seem to make up for items that are hard to access in Twi. Such behavior might suggest that when the activation level needed for the first language (L1) lexicon is so high that quick access isn't possible, speakers turn to the more easily available equivalents in the second language (L2), and this understanding is in line with the idea that lexical retrieval is influenced by how often words are used and how much exposure one has to them.

However, not all code-switching necessarily originates from attrition. Fluent bilinguals also switch codes for practical reasons, like to express themselves, to reflect their identity, and so on. These factors can shape attrition paths and complicate the interpretation of code-switching.

Our research aims to explore this complexity by looking at spontaneous second-language insertions during a semi-natural speech task. To reduce social inhibition and elicit more authentic behaviors, we weave bilingual prompts that involve code-switching into the task instructions. This approach treats code-switching as normal in the experimental setting, making participants feel comfortable switching languages, whether out of necessity or habit.

2.3. Switching granularity and linguistic weight

The place and fineness of switching have implications regarding how closely they are associated with attrition. Following Poplack's 1980 categorization [5], switches between sentences often reflect conscious planning and discourse management. In contrast, switches within sentences-especially single-word insertions-tie more directly to lexical processing. We contend that switches that involve high-load lexical items like nouns and verbs act as more delicate indicators of retrieval difficulty related to attrition than function words, fillers, or tags, which often represent discourse or social strategies.

To put this distinction into practice, we use a lexical sensitivity hierarchy based on Poplack's typology:nouns/verbs > adjectives/adverbs > function words > discourse elements.

When core content words appear spontaneously without being prompted by discourse needs, it could point to a failure in retrieving the first language (L1) rather than stylistic code-switching. Thus, our coding system focuses especially on switches in the highest-weight categories, treating them as behavioral clues of increased activation thresholds in the L1.

The trouble of setting clear-cut boundaries between borrowing and code-switching adds more complexity to the analysis. As Schmid [11] emphasizes, individual lexical insertions could result from either structural convergence or lexical attrition, and the methods at that time do not always enable a definite differentiation. Therefore, in our study, we do not attempt to classify borrowed items apart from switched ones, even though we remain conscious of this theoretical vagueness.

2.4. External predictors of attrition and their role in code-switching

Several external factors are always linked to attrition results. Among these, the age at which a second language (L2) is acquired, the age when attrition starts, the length of time the first language (L1) is absent or weakened, the attitude towards the language, and the quality of language exposure are often discussed in the literature. Attrition tends to be the most serious in childhood, and studies like Pallier's [12] research on internationally adopted children indicate that complete loss of L1 could happen if language exposure is cut off before the language is fully mastered. On the other

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hand, attrition in adults usually happens more slowly and often shows problems with accessibility rather than structural loss.

Code-switching patterns also appear to change with age. Data from older bilingual individuals indicate that involuntary switching and problems with word selection (lexical disfluency) grow as the ability to inhibit unwanted responses (inhibitory control) declines-a phenomenon that has been recorded in several studies of migrant groups [13]. These findings strengthen the idea that spontaneous code-switching might mirror temporary difficulties in retrieving words related to limitations in the processing system, especially when there is competition between words.

Our study probes whether heightened code-switching behavior acts as a behavioral correlate of lexical attrition by comparing code-switching frequencies and lexical diversity measures among participant groups and this view is based on recent researches which redefine attrition as a dynamic, context-sensitive process shaped by both cognitive and social elements.

3. Research question and hypotheses

We hypothesize that the frequency of lexical code-switching, particularly spontaneous switches of content words within sentences, links to the degree of first-language (L1) lexical attrition in adult Chinese-English bilinguals. Specifically, participants in English-dominant daily environments-whether living overseas or using English as their primary work/study language in China-are likely to display more frequent unconscious insertions of English words into Chinese. This tendency is expected to be more noticeable during tasks requiring rapid lexical access.

This prediction is based on the supposition that reduced L1 exposure raises the activation thresholds for L1 lexical entries. This makes retrieval harder during spontaneous speech production, in turn increasing the chance of using L2 items instead-items often more accessible due to their higher usage frequency.

We further expect that the frequency and pattern of such alternations (for example, the substitution of nouns and verbs) might act as indirect signs of lexical attrition, and comparisons among the three groups enable us to separate the impacts of language environment and usage patterns, providing an understanding of how code-switching behavior reflects the underlying attrition processes rather than strategic or stylistic choices.

4. Methodology

4.1. Participants

This study will recruit 150 adult Mandarin-English bilinguals aged 20 to 45. all of whom are native speakers of Mandarin without any reported neurological or language impairments. Participants are divided into three groups based on their degree of English (L2) exposure, with the high-exposure group comprising individuals who have lived long-term in English-dominant environments (e.g., international students primarily using English), the moderate-exposure group of participants from English-intensive academic settings in China (e.g., Sino-foreign joint institutions or English departments), and the low-exposure group selected from individuals in Chinese-medium institutions with limited regular involvement in English.

Group membership is determined using the LEAP-Q questionnaire, which collects comprehensive language background data, including self-reported proficiency, domain-specific language use, and length of L2 immersion. We assume Mandarin as the matrix language for all participants because of the shared L1 background and Mandarin-only task instructions. This aligns

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with the structural definition of the matrix language in the Matrix Language Frame model and reflects typical bilingual patterns in Mandarin-English contexts. However, when analyzing code-switching types, we will pay close attention to local switches that might challenge this default assumption.

To avoid the confounding effects of incomplete L1 acquisition, only participants who have received most of their language input in Mandarin before the age of 18 are included to make sure that all participants have a fully developed L1 system before potential attrition processes start.

4.2. Materials

Participants first should complete the Language Experience and Proficiency Questionnaire [14], which is used to gather crucial background variables such as the age at which Mandarin and English are acquired, self-rated proficiency in listening, speaking, reading, and writing in both languages, and estimates of the use of Mandarin and English in different areas (home, work, media, social), and to catch a possible factor related to the loss of the first language and the eagerness to switch codes during oral production. We plan to add a supplementary scale to assess the motivation for maintaining the first language which would explore the attachment to the identity of Mandarin, the perceived significance of keeping the first language, and the attitudes towards the potential decline of the first language, and the responses to the LEAP-Q are used both to confirm eligibility and as covariates in the analysis phase.

Lexical attrition and code-switching behavior will be elicited via a narrative production task adjusted from Ma [15]. Every participant is shown a short silent video (about 1-2 minutes) presenting a coherent scene without dialogue which involves physical actions, a bit of conflict or daily tasks. This video is made to prompt spontaneous narrative speech while preventing obvious linguistic priming and its content is emotionally neutral and not specific to any culture so as to guarantee that speakers from various backgrounds can access it.

4.3. Procedure

Participants start by finishing the LEAP-Q questionnaire which offers a general view of their language background, self-rated proficiency levels, and emotional inclination towards maintaining their first language (L1). After the questionnaire is submitted, they moved on to the experimental stage which will occur in a quiet room where Mandarin is the surrounding language, making sure there is as little second-language (L2) priming as possible during the task.

The oral production task requires narrating the happenings in a silent video clip and before watching the clip, the participants are given a brief verbal introduction to the task in Mandarin. In this short briefing, we subtly add a few English lexical items or short phrases into the Mandarin speech just to make the presence of English words in conversation seem normal and this approach is meant to subtly get the participants ready to view code-switching as a common and unremarkable aspect of bilingual talk and in the Chinese sociolinguistic situation, where using English insertions frequently in Mandarin speech might sometimes be seen as showy or not genuine. Such preparation is to lessen possible inhibition or self-censorship during the narrative task and meanwhile, we deliberately do not tell the participants clearly that code-switching is okay or desirable for fear of causing the opposite effect of overusing English on purpose and the aim is to present code-switching as a natural and accidental part of normal speech, not as a noticeable behavior to be judged.

Participants are then shown the silent video once, after which they are asked to describe what has occurred in the clip in Mandarin without any visual or written prompts, and they will be neither

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interrupted nor corrected during the narration, so their spontaneous speech can be fully audio-recorded and later transcribed for analysis.

Mandarin is assumed to be the matrix language all through the task, considering the participants' common L1 background and the Mandarin-language prompt, and English insertions would be regarded as embedded elements. Code-switching frequency would be calculated as the number of English words divided by the total number of words in the speech sample. Besides the overall frequency, each instance of English insertion would be classified following Poplack's [5] syntactic framework which groups switch according to grammatical function: nominal elements (such as nouns and noun phrases), verbs and auxiliaries, modifiers (like adjectives and adverbs), phrasal elements (for example, prepositions and prepositional phrases), and functional items (such as determiners and conjunctions). This analysis enables us to trace which linguistic areas are most likely to be affected by cross-language interference and to tell the difference between unconscious lexical substitution and more structurally embedded switching.

To evaluate lexical attrition, we would analyze two crucial indicators: lexical diversity, which is measured by Moving Average Type-Token Ratio (MATTR), and lexical density, computed as the proportion of content words to total words, using the Modern Chinese taxonomy proposed by Huang and Liao in 2007 [15]. These measures can show the scope and informativeness of the participant's active Mandarin lexicon and are used to study how second-language immersion and code-switching behaviors interact with first-language lexical retrieval.

5. Data analysis plan

All oral tales will be transcribed by hand and divided into clauses, and each sample will be examined in two aspects: lexical abundance (as a substitute for L1 attrition) and code-switching conduct.

Two quantitative indices will be used to evaluate lexical richness, the Moving Average Type-Token Ratio (MATTR) with a fixed-length window to control the influence of utterance length will measure lexical diversity and lexical density calculated as the proportion of content words (defined according to the Modern Chinese classification system [5] to the total number of words in the transcript, and these two indices are indicators of the speaker's active L1 lexical access, with lower scores possibly reflecting lexical erosion related to long-term L2 dominance.

Code-switching would be quantified as the percentage of English lexical items in relation to the total word count in each utterance, with disfluencies being excluded and besides the overall frequency, every instance of English insertion has to be syntactically categorized based on Poplack's framework [5]: nouns and noun phrases, verbs and verb phrases, modifiers (adjectives/adverbs), prepositions and phrasal elements, and functional items like determiners and conjunctions, which allows us to see if certain grammatical categories are more likely to be subject to cross-linguistic interference or substitution.

Statistical analysis mainly centers on probing the relation between lexical richness and code-switching frequency among the selected participants. We intend to use Pearson correlation analyses to check if more code-switching is significantly associated with lower lexical diversity or lexical density, which might suggest attrition. Group comparisons would also be carried out by means of ANOVA to test for differences and variances in lexical measures and code-switching patterns within the three exposure groups (high, moderate, and low L2 exposure). Extra regression modeling can be utilized to control for covariates like age of acquisition, self-rated proficiency, and L1 maintenance motivation scores drawn from the LEAP-Q.

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The inter-rater reliability of transcription accuracy and syntactic categorization of code-switched items in this thesis is going to be calculated; any discrepancies will be resolved through discussion among annotators so as to ensure consistency in the process of coding.

6. Expected contributions and limitations

This research aims to explore whether the frequency and structural traits of code-switching in first-language (L1) narrative creation can act as indirect signs of lexical attrition among adult Mandarin-English bilinguals and through analyzing spontaneous oral production in a natural and low-stress environment, we hope to find out how lexical access in L1 might be affected by continuous second-language (L2) exposure and the dynamics of bilingual processing.

We anticipate observing a higher code-switching frequency and a decreased lexical richness, which is, lower diversity and density, among participants with a greater degree of the L2 immersion. Through which, we can support the hypothesis that lexical attrition arises from the impaired activation of L1 items and the growing dependence on embedded L2 forms. Additionally, if a statistically significant negative correlation emerges between the code-switching frequency and the lexical richness, it shows the vivid evidence that unconscious or compensatory L2 insertions may to some extent, reflect the difficulties in retrieving appropriate L1 lexical items, in line with theoretical frameworks like the Activation Threshold Hypothesis and the Competition Model [15].

Furthermore, the syntactic classification of code-switched elements might disclose more subtleties regarding how bilingual individuals handle lexical gaps. For instance, a greater percentage of switches within content word classes (particularly nouns and verbs) can indicate a failure in lexical retrieval, in contrast, switches among function words or fillers might be more style-related or driven by discourse and these discoveries could assist in distinguishing between code-switching that is attrition-led and that which is socially or pragmatically motivated.

Nevertheless, certain constraints also need to be recognized. In the specific Chinese sociolinguistic environment, code-switching behavior is frequently stigmatized or stylized, therefore, the participants might deliberately suppress or overstate switching, irrespective of lexical requirements. Although our briefing process endeavors to mitigate this bias via subtle priming, we are not able to entirely eliminate self-monitoring impacts. Additionally, the lack of a baseline monolingual control group implies that our understanding of "attrition" is unavoidably relative among bilinguals with different L2 exposures, rather than absolute. Lastly, the narrative task captures a momentary view of L1 production in semi-controlled circumstances and might not be fully applicable and available to other communication areas like written language or formal speech.

In spite of these restrictions, the current design presents a practical and theoretically-based method for looking into L1 lexical attrition among adult bilinguals, particularly when longitudinal data can't be obtained and we expected that our results would help in achieving a more profound comprehension of how code-switching functions not just as a social occurrence, but also as a cognitive and linguistic sign of the hidden lexical alteration in the bilingual brain.

7. Conclusion

This study examines lexical attrition in adult Chinese-English bilinguals and proposes that intra-sentential, word-level code-switching may serve as a possible behavioral indicator of reduced access to the L1 lexicon. Drawing on the Activation Threshold Hypothesis, which considers attrition as a rise in retrieval thresholds rather than a loss of linguistic representations, we suggest that code-switching can be understood as a cognitive response on a behavioral level to limited L1 use. By

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combining measures of lexical diversity, code-switching analysis informed by Poplack's framework, and detailed language background profiling, this research aims to explore the relationship between the degree of attrition and the frequency of unconscious code-switching. The study seeks to contribute to a dynamic model of L1 attrition focused on lexical accessibility and offers a potential method for identifying subtle signs of language attrition. These findings may also help inform broader discussions about language maintenance in multilingual individuals.

Acknowledgement

Xinhe Li, Lanxi Peng, and Yining Zhang contributed equally to this work and should be considered co-first authors.

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