Journal of Education and Educational Research
ISSN: 2957-9465 | Vol. 10, No. 2, 2024

Do First Language, Word Frequency and Input Matter in Bilingual's Language Acquisition?

-- A Corpus Study on the Acquisition of Third Person Singular by Bilingual Children

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Abstract: The acquisition of morphosyntactic features, such as third-person singular (3SG) inflection, is a critical aspect of language development. While much research has focused on monolingual children's acquisition of 3SG inflection, less is known about how bilingual children navigate this process, particularly those from non-inflectional first language (L1) backgrounds. Furthermore, two well established characteristics found in other bilingual groups: word frequency and L1 transfer are still remain unclear in the acquisition of 3SG inflection in Chinese-English bilingual groups. Addressing these gaps are crucial for understanding the unique challenges bilingual children face and the factors influencing their acquisition of English morphosyntatic feature. In this study, we employed corpus to analyze longitudinal naturalistic data from three Chinese-English bilingual children and one English monolingual child. We investigated the children's use of 3SG inflection across obligatory contexts, examining the frequency of verb exposure in both parental input and a large corpus (COCA). Our results indicate that bilingual children, especially those from a non-inflectional L1 background, demonstrated delayed acquisition of 3SG inflection compared to monolingual counterparts. However, both groups showed better accuracy with high-frequency verbs, underscoring the importance of input frequency. Additionally, L1 transfer effects were evident in both monolingual children and bilingual children, with the bilingual children struggling more with verbs whose L1 lacked verb agreement. These findings suggest that both input frequency and L1 transfer play significant roles in shaping bilingual children's acquisition of 3SG inflection. This study contributes to a deeper understanding of bilingual language development, with implications for language acquisition theory and educational practices, particularly in addressing the needs of children from diverse linguistic backgrounds.

Keywords: Bilingualism; Corpus-Based Study; L1 Transfer; Third Person Singular Acquisition; Word Frequency.

1. Introduction

Third person singular is an important feature in English grammar, which is an agreement of verbs and third singular nouns (e.g., Tom) or pronouns (e.g., he, she, it) in present tense. Previous studies found that bilinguals differ from monolinguals in their language acquisition (Bybee, J., 2008). Even though studies have found different acquisition pattern in bilinguals compared to their counterparts, these findings were confined to specific bilingual groups (McDonald, 2000; Paradis, 2011). Few studies shed light on bilinguals who enjoys two distant languages acquired another language. Hereby, in this study we will further explore whether Chinese-English bilinguals exhibit different or similar language acquisition development and the factors contributed to these differences or similarities. In order to answer the research questions, we chose three bilingual children and one monolingual child (as a control group) in our corpus. Furthermore, previous studies also found word frequency effect (Bybee, 2008) and L1 transfer effect (McDonald, 2002; Blom et al., 2012; Hsieh, 2009) in acquisition on verb morphology; thus, in this study we will further explore whether the differences and similarities between monolingual and bilingual children are linked to these factors.

2. Literature Review

2.1. Studies on Monolinguals and Bilinguals' 3SG Acquisition

Robust previous studies found that the third-person singular (3SG) marker is acquired relatively late compared to other grammatical morphemes (Brown, 1973; de Villiers & de Villiers, 1973; Dulay & Burt, 1974; Jia & Fuse, 2007; Paradis, 2005). In these studies, the word "acquisition" has typically been defined as the accurate use of 3SG in obligatory contexts. Monolingual children are reported to achieve over 90% accuracy in the use of 3SG earlier than their bilingual counterparts. Brown (1973), using a corpus-based approach, was the first to show that third-person singular marking is among the last morphemes to be acquired by English-speaking monolingual children, with mastery typically occurring around four years of age.

Similar to monolinguals, bilingual children acquire the 3SG marker relatively late and often omit it in obligatory contexts. (Brown, 1973; Paradis, 2005; Blom, Paradis & Duncan, 2012). However, studies also show that bilinguals showed different pattern from their monolingual counterparts, where bilinguals exhibit lower accuracy in the use of 3SG compared to their monolingual peers, as measured by grammaticality judgment tasks in Spanish-English bilingual (Gathercole, 2002a, 2002b, 2002c).

2.2. Word Frequency Effect

Another noteworthy feature of 3SG acquisition is the frequent omission of the morpheme in obligatory contexts by both monolingual and bilingual children. Research has suggested that this omission correlates with the frequency of the bare verb form in the input: the more frequently a verb appears in its bare form, the more likely children are to omit the 3SG –s (Blom, Paradis & Duncan, 2012). Supporting this, Bybee (2008) posits that the development of 3SG *–s* inflection is largely determined by how often verbs occur with this inflection in the input, as each instance reinforces the learner's memory of the form. Thus, children are predicted to be more accurate with verbs that occur frequently with 3SG *–s* in the input. In this study, we refer to this phenomenon as "word frequency effect" and examine its role in 3SG acquisition.

2.3. L1 Transfer Effect

Even in bilinguals, there are also some differences withn groups. Research has identified significant differences between bilingual groups depending on their L1. Bilinguals whose L1 features a rich inflectional system (e.g., French, Spanish) tend to perform better than those whose L1 lacks such a system, such as Chinese or Vietnamese (McDonald, 2002; Blom et al., 2012; Hsieh, 2009). Gathercole (2007) attributes this difference to the possibility of cross-linguistic transfer: bilingual children may transfer patterns from their L1 to their L2 if these patterns are sufficiently abstract and structurally similar. Consequently, it is plausible that children learning English as an L2 who possess an inflectional schema for 3SG in their L1 may be better equipped to acquire the English 3SG marker, whereas children from non-inflecting L1 backgrounds may lack such prior knowledge, complicating their acquisition of this feature.

2.4. Research Gaps and Research Questions

Despite significant progress in understanding 3SG acquisition, the majority of previous studies have focused on bilinguals from European language backgrounds. Few studies have investigated the acquisition of 3SG by children whose L1 is a non-alphabetic language, such as Chinese. Given the evidence supporting cross-linguistic transfer effects (Blom et al., 2012), this study focuses on Chinese-English bilinguals' acquisition of 3SG.

While McDonald (2000) reported that Vietnamese children performed less accurately than their Spanish-speaking counterparts in grammaticality judgment tasks, this finding lacks support from data on spontaneous utterances. From this perspective, this study employs a corpus-based method to address the gap.

Besides, Paradis (2011) observed that Mandarin-speaking EFL learners were less accurate in their use of 3SG than learners with L1s featuring rich inflectional systems (e.g., Hindi, Spanish, Arabic). However, Paradis' study did not account for participants' exposure to English, a factor known to influence proficiency. Given that exposure is well-documented to affect EFL learners' language outcomes, it is important to investigate whether differences in exposure levels contribute to the observed discrepancies, in addition to L1 transfer effects. Our chosen corpus provides detailed information on participants' English exposure, enabling us to address this issue.

Based on these research gaps, hereby, we propose the following research questions:

RQ1: Do monolingual and bilingual children follow similar developmental trajectories in the acquisition of 3SG?

RQ2: Do monolingual and bilingual children differ in their developmental stages of 3SG acquisition?

RQ3: What roles do L1 transfer and word frequency play in bilingual children's acquisition of 3SG in English?

3. Methodology

3.1. Participants

We analyzed longitudinal and naturalistic language sample data from three Chinese-English bilingual children Luna, Avia, Winston and one English monolingual child Adam. They were all born and grew up in different cities in the United States. Luna received the exposure to Mandarin Chinese at home from birth and she was exposed to English in nursery and preschool from 9 months old. Her parents adopted one contexts-one language strategy. Her English sample data were collected form 46 months old to 59 months old. Avia exposed to both Mandarin Chinese and English from birth and her parents adopted one parent-one language principle, where the mother speaks Mandarin and the father speaks English. Her language sample data were collected form 32 months old to 45 months old. Winston was exposed to Mandarin Chinese and Cantonese since birth and received exposure to English form 20 months old when he began going to the nursery. Before 36 months old, he received exposure to 4 languages, and after that he received more English exposure. The English data were collected from 37 months old to 43 months old. The data from the English monolingual child Adam was used as a control group, and we only analyzed his data between 27 months old to 49 months old.

3.2. Data Collection

The corpora we used is *Child Language Data Exchange System* (CHILDES). The bilingual corpora we used are from *CHCC* in CHILDES. The language samples were recorded when the children were playing toys with their family members and investigators. The monolingual corpus is from *Brown* in CHILDES.

We extracted obligatory contexts of third person singular inflection including correct use and errors. The KWAL command was used to extract all the sentences with obligatory contexts. We firstly used the key words he, she and it to find the sentences. Then we selected the contexts requiring third person singular inflection. To collect utterances with obligatory contexts, we examined 5 tokens before and after the specific utterance (the "he, she, it" sentence). And we excluded tokens formed in 3SG but appeared in non-obligatory context (e.g., past tense). Additionally, we observe the contexts of input. For example, as shown in (1), form the investigator's utterance, we decide the context in child's utterance required past tense inflection, so we excluded this context. In (2), the investigator' utterances indicated that the child's utterance needed the third person singular reflection, so we counted this context.

(1) Luna: oh my goodness, <she take> [//] he take Ariel's dad king crown.
Investigator: oh, she took her crown. *(Luna 04;10;16)*

(2) Investigator: he looks very pale, hm.
Investigator: he doesn't look very well.

Luna: she need somebody help with her. *(Luna 04;07;10)*

Given that we only study the use of third person singular inflection in obligatory contexts, so the incorrect use of 3SG in other contexts was not considered. Besides, we did not evaluate WH-questions because the WH-questions produced by the children in our study had no auxiliary verbs such as do and does. We also did not take the verb be into account. In addition, we excluded the repeated utterances, for example, "she have, she have …".

In order to address our second research questions, whether word frequency would exert influence on children's acquisition, we used FREQ command to calculate the word frequency in input and we examined these words' frequency in another corpus COCA, which was similar to Blom et al., 2012.

3.3. Data Analysis

3.3.1. Suppliance in Obligatory Contexts (SOC)

We employed Suppliance in Obligatory Contexts (SOC) to determine accurate suppliance of third person singular -s inflection in linguistic contexts in which the inflection is required in standard English (Pica, 1983). This measure was used in many studies (eg: Brown, 1973; Dulay and Burt, 1974). Since we did not collect their misuse cases, thus, the formula used is shown below.

$$SOC = \frac{(\text{n correct suppliance in obligatory contexts} \times 2)}{\text{Total obligatory contexts} \times 2}$$

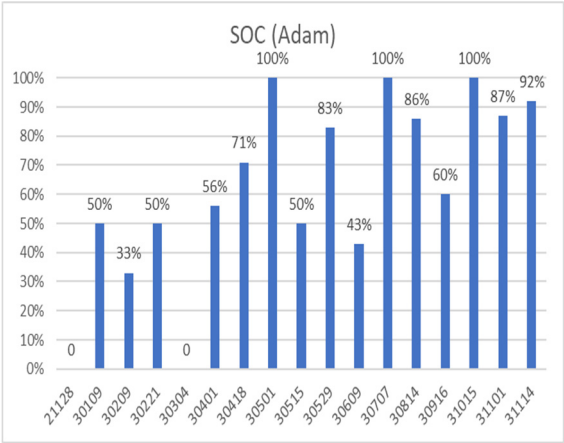

Figure 1. *Suppliance in Obligatory Contexts (SOC) for Adam (monolingual) in different ages*

Table 1. *Accuracy in SOC and MLU of Adam (monolingual)*

age	Number of obligatory contexts	Number of correct uses	SOC	MLU
021128	7	0	0	
030109	2	1	50%	4.050
030209	3	1	33%	
030221	2	1	50%	
030304	1	0	0	
030401	9	5	56%	4.200
030418	7	5	71%	4.539
030501	4	4	100%	
030515	12	6	50%	
030529	6	5	83%	
030609	7	3	43%	4.393
030707	5	5	100%	
030814	7	6	86%	
030916	5	3	60%	4.661
031015	6	6	100%	
031101	8	7	87%	4.691
031114	13	12	92%	4.572

At the age of 3 years and four or five months old, the monolingual child Adam started performing better on third person singular inflection but with some fluctuation in following transcripts (e.g., 50%, 03;05;15, 43%, 03;06;09).

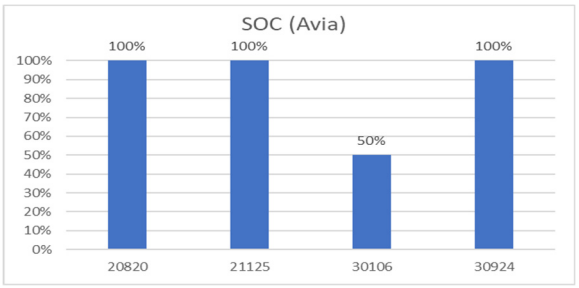

Figure 2. *Suppliance in Obligatory Contexts (SOC) for Avia (bilingual) in different ages*

Table 2. *Accuracy in SOC and MLU of Avia (bilingual)*

age	Number of obligatory contexts	Number of correct uses	SOC	MLU
020820	6	6	100%	5.206
021125	1	1	100%	4.443
030106	4	2	50%	4.651
030924	7	7	100%	7.970

Avia seems to use the inflection consistently correctly at a very early age and even be similar with the monolingual child. As we can see that her SOC is quite high (e.g., 100% in three transcripts). We only obtained 4 transcripts using our data extraction method, but it seems Avia had better mastery of 3rd person singular inflection.

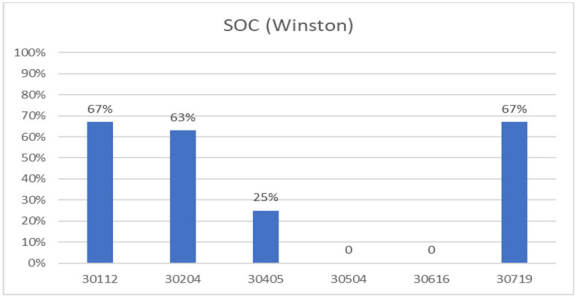

Figure 3. *Suppliance in Obligatory Contexts (SOC) for Winton (bilingual) in different ages*

Table 3. *Accuracy in SOC and MLU of Avia (bilingual)*

age	Number of obligatory contexts	Number of correct uses	SOC	MLU
030112	6	4	67%	2.926
030204	8	5	63%	4.970
030405	4	1	25%	3.595
030504	2	0	0	
030616	4	0	0	4.446
030719	3	2	67%	3.645

For Winston, we can see he could use the third person singular correctly at around 3 years old with accuracy (67%, 63%), although his accuracy dropped to 25% at the file "030405". Later he made many errors, but mainly in new

verbs according to the data. At the last transcript, although there are only three contexts, he used two of them correctly. We predict that he made progress in this period.

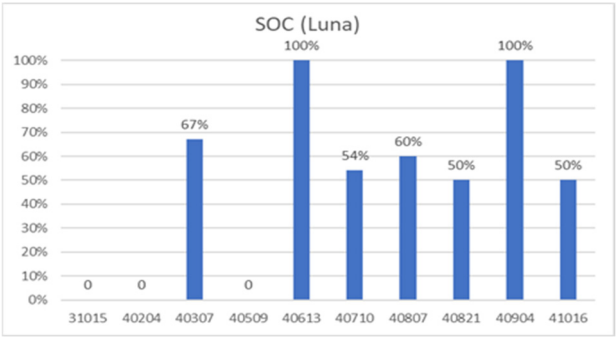

Figure 4. *Suppliance in Obligatory Contexts (SOC) for Winton (bilingual) in different ages*

Table 4. *Accuracy in SOC and MLU of Luna (bilingual)*

age	Number of obligatory contexts	Number of correct uses	SOC	MLU
031015	3	0	0	3.023
040204	3	0	0	
040307	3	2	67%	4.421
040509	2	0	0	
040613	1	1	100%	4.288
040710	13	7	54%	4.506
040807	5	3	60%	3.990
040821	2	1	50%	
040904	3	3	100%	5.688
041016	6	3	50%	5.636

By analyzing the data form Luna's language sample, we can decide that she could use the inflection correctly after 4 years old (04;03;07) (67%) which is much later than the other children.

3.3.2. Word Frequency

We collected the frequency of input of verbs that, to investigate whether there is a correlation between the frequency and children's production of 3rd person singular inflection. Only the verbs with 3rd person singular form from the input were considered.

Table 5. *Frequency of Input and Proportion of Correct Uses for Individual Verbs (Adam, monolingual)*

	Frequency of input	Number of correct uses	Number of errors	Proportion of correct uses
has	108	12	8	60%
wants	37	6	7	46%
goes	96	3	1	75%
breaks	1	1	2	33%
catches	0	0	1	0
examine	0	0	1	0
checks	2	0	1	0
stays	2	0	1	0

Table 6. *Frequency of Input and Proportion of Correct Uses for Individual Verbs (Avia, bilingual)*

	Frequency of input	Number of correct uses	Number of errors	Proportion of correct uses
has	40	7	0	100%
doesn't/does	0/16	2	0	100%
stands	0	3	0	100%
wants	4	1	0	100%
gets	16	1	0	100%
blocks	0	1	0	100%
carries	3	0	2	0

Table 7. *Frequency of Input and Proportion of Correct Uses for Individual Verbs (Winston, bilingual)*

	Frequency of input	Number of correct uses	Number of errors	Proportion of correct uses
has	9	2	1	67%
doesn't/does	0/21	2	1	67%
needs	9	3	0	100%
looks	8	1	0	100%
Takes	0	1	1	50%
likes	4	1	0	100%
Turns	1	1	0	100%
goes	8	1	2	33%
wants	4	0	3	0
breaks	0	0	1	0
blows	0	0	1	0
sleeps	2	0	2	0
whistles	0	0	1	0

Table 8. *Frequency of Input and Proportion of Correct Uses for Individual Verbs (Luna, bilingual)*

	Frequency of input	Number of correct uses	Number of errors	Proportion of correct uses
has	66	4	9	31%
does	38	2	0	100%
looks	34	12	0	100%
sings	0	1	0	100%
goes	6	1	0	100%
turns	0	0	1	0
needs	3	0	1	0
knows	7	0	1	0
wants	4	0	3	0
wakes	1	0	2	0
takes	0	0	1	0
puts	0	0	1	0
tries	2	0	1	0
remembers	4	0	1	0

Although the monolingual child Adam consistently produced most of the verbs with 3rd person singular inflection, he could not correctly use 3rd person singular inflection in a small group of verbs that had quite low frequency in the input such as catch, examine, check and stay. Similarly, the bilingual children also had difficulty in verbs with low frequency of exposure. Winston could not correctly produce some verbs with 3rd person singular if the frequency of input was lower, such as break, blow, and sleep. Luna showed a significant difference between verbs with higher and lower input. She could correctly use the inflection on verbs with high frequency of input such as have, do and look, while she made many errors on verbs with much less input.

However, the data also displayed that the children could also correctly produce a few verbs with the 3rd person singular inflection when there was no or much less input, such as block in Avia's sample, take, turn in Winston's sample and sing in Luna's sample.

4. Discussion

This study aimed to explore the similarities and differences between monolingual and heritage bilingual children in their acquisition of third-person singular (3SG) inflection and to examine the roles of word frequency and L1 transfer in these differences.

4.1. Differences in Monolingual and Bilinguals' 3SG Acquisition

Bilingual children exhibit a delay in acquiring 3SG inflection compared to the monolingual child, Adam. For instance, Winston frequently omitted the 3SG inflection in less frequently exposed verbs at around 3 years old, while Adam appropriately produced verbs like want, go, and break at the same age. Similarly, Luna displayed persistent errors with have and other common verbs (e.g., put, take, wake, need) even after 3 years and 10 months, while Adam consistently used these forms correctly by age 3. These omissions suggest

that some bilingual children have not fully acquired the rules for 3SG inflection, leading to delayed development compared to monolingual peers.

4.2. Similarities in Monolingual and Bilinguals' 3SG Acquisition

Despite these differences, there were notable similarities in the acquisition patterns. Both monolingual and bilingual children showed earlier mastery of frequently exposed verbs such as does, has, and looks, and struggled with less frequent verbs like catch, blow, and remember. This aligns with previous studies indicating that the frequency of a verb's occurrence with 3SG inflection strengthens its representation in memory (Bybee, 2008). Avia, one of the bilingual children, displayed SOC results comparable to Adam's, suggesting that bilinguals can reach proficiency levels similar to monolinguals, despite receiving less exposure.

4.3. L1 Transfer Effect

Bilingual children demonstrated lower accuracy in 3SG inflection compared to Adam, though their Mean Length of Utterance (MLU) was not significantly different. This suggests that their delay in 3SG acquisition is not part of a broader delay in L2 English but is likely influenced by L1 transfer. This aligns with previous findings on L1 effects in verb inflection acquisition in L2 learners (Dulay & Burt, 1974; McDonald, 2000; Paradis, 2011). Research comparing bilinguals from languages with rich inflectional systems and isolating systems has shown that children from isolating L1 backgrounds, such as Chinese, perform worse in acquiring English inflections (McDonald, 2000).

Given the substantial typological distance between Chinese and English, it is plausible that Chinese speakers, whose L1 lacks verb agreement with third-person singular nouns and pronouns, do not process such agreement naturally. This processing pattern in their L1 may transfer to their L2 acquisition, contributing to delays in mastering 3SG inflection in English.

4.4. Word Frequency Effect

As discussed in Section 1.2, word frequency plays a critical role in 3SG acquisition. Given that both bilingual children and monolingual child are all from the United States. Hence, we analyzed both the input frequency and the frequency data from *Corpus of Contemporary American English* (COCA), following Blom et al. (2012). Our results showed that high-frequency verbs such as have and has been used more accurately by both monolingual and bilingual children, reflecting their higher frequency in both the parental input and COCA corpus. In contrast, verbs like climbs, bites, and wakes, which are low-frequency in both input and COCA, were more prone to errors, consistent with previous findings.

Additionally, we observed variability in the accuracy of new verbs. For instance, although catches and climbs were similar in input frequency, children struggled more with catches. This may be related to the phonological complexity of the /iz/ allomorph in catches. Previous research on plural morphology acquisition has shown that allomorphs such as /xs/ are acquired later due to their phonological complexity. Thus, we hypothesize that both word frequency and phonological factors influence the acquisition of 3SG inflection. In COCA, a corpus for American English word use, *catches* appeared with much lower frequency (10,536 occurrences) compared to *have* (5,024,064 occurrences), supporting our conclusion that children's difficulties with new verbs are strongly linked to input frequency.

5. Conclusion

This study examined the acquisition of third-person singular (3SG) inflection in both monolingual and bilingual children, with a particular focus on the roles of word frequency and L1 transfer. Our findings indicate that bilingual children generally experience a delay in acquiring 3SG inflection compared to monolinguals, particularly with less frequently used verbs. However, similar patterns of earlier mastery of high-frequency verbs were observed in both groups, suggesting that word frequency significantly influences the rate of 3SG acquisition. This supports the frequency-based findings to language acquisition; wherein frequent exposure strengthens a child's memory representation and facilitates more accurate use of grammatical forms.

Additionally, we observed evidence of L1 transfer particularly in the bilingual children whose L1 lacks verb agreement. The typological language distance between Chinese and English likely contributed to delays in 3SG acquisition, as bilingual children struggled to apply the grammatical rules governing 3SG inflection in English. This finding aligns with previous research on L1 transfer and highlights the importance of considering L1 effects in the acquisition of L2 morphosyntactic structures.

In summary, this study reinforces the critical role of input frequency in the acquisition of grammatical morphemes and provides further evidence of L1 transfer effects in bilingual language development. Future research could continue to explore how various factors interact in the acquisition of inflectional morphology across different bilingual populations, such as L1 background, input frequency, and phonological complexity, which we guessed that may contribute to the delay acquisition of 3SG ends up with */iz/* . This line of inquiry will deepen our understanding of how bilingual children acquire morphosyntactic features and inform more effective pedagogical approaches for language learners with diverse linguistic backgrounds.

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