Article

Examining /l/ variation in Singaporean bilingual child-directed speech for sociophonetic insights

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Abstract: Language is integrated into multiple dimensions of human behavior, and social work is essentially a language-centered activity. Although language plays a key role in many social work activities, few studies have explored its significance from the perspective of differences. This paper introduces the process of language conceptualization in social work and points out the limitations of some existing conceptual perspectives in the multilingual context in which language and social work are viewed. In English language variation, language variation mainly includes dialect, stress, register and variation. Dialects are the starting point of the study of language variation, so this paper takes dialects as a representative to study this field. First, the definition of language variation and its related factors are introduced and discussed, and how to define and study language variation is further discussed. Second, dialects are taken as a representative area to delve deeper into language variation. The different types and features of dialects are analyzed. Finally, the influence of dialects and language variation on education, society and other aspects is reviewed, highlighting some of the important effects observed in previous research.

Keywords: English; language variation; social work; diversity

1. Introduction

1.1. Definition and factors of language variation

When it comes to the definition and meaning of language variation, most researchers believe that language variation should be studied and defined through variables and variant (Bolton and Ng, 2014; Amengual, 2018; Mirvahedi and Cavallaro, 2020). Language variation is represented by variables and variations. This approach can be used to define language variation as accurately as possible, both from a quantitative and qualitative perspective. In general, the general or abstract characteristics being studied are called variables in research. Variation refers to the actual implementation of a variable. A variable can correspond to two or more variants (Bao, 2015; Reddy and Van Dam, 2020). For example, when (ear) is a variable, the corresponding variants are [ie] and [ee]. For example, words like singing and fishing are sometimes pronounced singin’ and fishin’. The variable here is the last sound (ng) of these words. Two variants appear here, namely [n] and [n]. Models using language variables make it easier to study, define and understand the process of language variation. Language variation and change “are often considered synonymous with the sociolinguistics of variation”. Moreover, variation in language is generally thought to be socially controlled. Social factors associated with society (such as class and gender)
are often used as social parameters to explain language variation and patterns of language variation. However, language variation does not always correlate with the social class and gender of the speaker. Language variation tends to be distributed throughout the population, regardless of class or gender (Sim and Brechtje, 2023).

1.2. Types of language variation

Through social investigations of language variation, researchers have drawn some insights and conclusions from the socio-geographical distribution of accents and dialects. People in different regions and different societies do not speak in exactly the same way, nor do individuals within certain social categories (Barlow et al., 2013). Their language contains both standard and non-standard parts. In fact, the theory of language variation is based on the study of probability statistics of relative similarity and varying degrees between speakers and social situations, as well as within and between groups. Language variation refers to differences between them. When it comes to the definition of “dialect” and “accent”, “dialect” is the general term for speech variations that are socially and geographically related, while “accent” refers to the phonetic aspects of a dialect.

Language variation includes many elements and aspects. Examples include dialects, accents, registers and variations. Dialect is the starting point for discussing language variation. A language contains many dialects. Language is expressed in dialects. A dialect is any variation of a language. A dialect is any language spoken by a group of people. In addition, dialect is a neutral concept, there is no good or bad. Different dialects are related to relevant social factors, such as geographical location, cultural identity and so on. Although in common usage, dialect is often considered to be the opposite of “correct”, but as a linguistic technical term, dialect only refers to a different form of language, there is no better or worse. The definitions and judgments of “standard” and “non-standard” in dialects are derived from sociology rather than linguistics. It is difficult to define dialects. In terms of classical definition, the definition of dialect refers to a local dialect, that is, a dialect is a unique form of language spoken within a specific geographical area. It’s crucial to note that dialects aren’t purely regional, social, or ethnic. This is because dialects often appear in different regions, different societies and different peoples. The use of dialects simply indicates a change in the way in which dialect speakers use language elements.

1.3. Using variables and variants to study language variation

There are two main types of dialects in linguistics, namely geographical dialects and social dialects. A geographical dialect is a variety associated with a dialect-speaking population living in a particular geographic area. Social dialects are variations associated with specific groups of people. Men and women, different social classes, etc. We can supplement and improve the definition of dialect on the basis of the discussion of register. Register variation is the linguistic difference related to different situations. The linguistic features and structures of a particular register are more or less restricted. Register variation is closely related to repeated communicative situations and types of language information in society. It has the characteristics of customization. For example, the language used by scientists in their lab reports, the
language used by sports journalists in their event reports, the language used by writers in their short stories, the language of law, the language of aviation, and so on. Register is a form of speech in which grammatical structures overlap, it can be distinguished by language, and it simply contains variations of the language. The same is true of dialects. In addition, it is worth mentioning that the register difference of a language is mainly reflected in the semantic difference, while the dialectal difference of a language is mainly reflected in the phonetic difference (Bates et al., 2015; Broesch and Bryant, 2018; Kirkham and McCarthy, 2021).

In short, language variation mainly includes dialects, accents, registers and variants. Language variation is based on similarity and difference of probability statistics. By introducing the concepts of variables and variants, we can study and define language variation more accurately (Fish et al., 2017; Kirkham and McCarthy, 2021; Tian and Yu, 2021).

1.4. Previous research on English-Malay bilinguals’ /l/ variation

Phonological features in the speech of certain English-Malay bilinguals derived from Malay. The study investigated if, how, and why Singaporean English-Malay bilinguals alter their English /l/ in child-led speech, and whether such phonological changes may be influenced by social conditions. The laterals in the directed speech of English children in 10 father-son pairs and their preschool children were analyzed by auditory and acoustic methods. Participants were either simultaneous or early English-Malay bilinguals. Results indicate that in informal contexts, both mothers and fathers employ the relatively clear /l/ for all syllable positions. In formal teaching settings, mothers exhibited a significant darkening in the caudal aspect, whereas fathers showed no difference in the darkness of lateral sounds. Additionally, fathers’ lateral sounds did not display a significant positional difference in formal settings, although some fathers of young children produced more vocalizations than in informal settings. The observed variations are discussed by exploring the potential social-exponential significance of /l/ these variations in the context of Singlish’s variationist interpretation, and by comparing them with variations in the social conditions of speakers of both monolinguals and ethnol elective languages. Differences between maternal and paternal child-directed speech (CDS) patterns may be attributed to gender roles and cultural expectations for the dominant role of mothers in parenting, and may also be the result and precipitant of the potentially more complex repertoire of Malay women (Dawson et al., 2023).

1.5. Theories explaining sociolinguistic variation in Singapore

Just as both monolinguals and ethnic groups select the different speech styles of the speakers, Singaporeans can choose features from their English repertoire that align with established standards (prescriptive norms) and local forms, with some being more ethnically specific than others (refer to Leimgruber (2013, pp. 26–63), for discussion). Recent Singlish variety descriptions align with third-wave variationist sociolinguistics, examining language use through the social-exponential meaning of these linguistic resources. Depending on the context in which it is used, variants linked to standard English varieties may signal formality, authority, and educational
attainment. In contrast, local features such as Singlish and ethnic markers embody sociocultural capital, signaling informality, camaraderie, and group membership. For example, in terms of segmental modification, Moorish and Deterding (Simonet, 2015), found that Singaporean undergraduates in their study used more dental fricatives in formal conversations with British lecturers than Singaporean students with whom they were familiar, and that the stops were more frequent among Singaporean students. Leimgruber (Stoehr et al., 2019) also describes the release or desire for endings that would not normally be released in Singapore English (SgE) to indicate an affectation or pedantic position in some cases. In formal style, Singaporeans also have fewer ethnic accents. Bolton and Ng (2014) describe the ethnic groups in Singapore, undergoing a situation akin to immigrant groups globally, due to substantial language changes since the 1960s. Third-generation Singaporeans are becoming more proficient in English. Thus, like the second-generation speakers of Sharma (Lee-Kim et al., 2013), according to Sharma and Sankaran (2011), language choice among modern Singaporeans, including the incorporation of features from different races is less likely linked to English proficiency, imperfect learning, or cognitive limitations. Instead, it is more likely influenced by sociocultural factors and motivations.

The aim of this study was to understand whether and how Singapore English Malay bilingual caregivers segmented the CDS of their young children and the social indicator factors that might mediate their changes. The focus is characterized by the syllable vowel /l/. This is an interesting case because there are probably three forms used in previous SgE studies by these 2 J.H. SEMis/Journal of Phonetics 88 (Serrau et al., 2023). 101084 careers: vocalsed-l (or deleted-l in some speech contexts; main local form), dark-l (variant related to explicit standard), and clear-l (variant of Malay origin used by some English-Malay bilinguals).

The above research shows how social factors regulate language choice in CDS among bilinguals or ethnic speakers, and describes how bilinguals or ethnic speakers strategically use alternative speech forms, especially variants of /l/, according to their social index meaning. Social factors impact Singaporeans’ language choices, as they select forms from their repertoire within standard variants and local dialect features, including those of different races, based on their communicative needs. This study aims to explore whether and how bilingual Singapore-English-Malay caregivers utilize the /l/ variant in English child-directed speech (CDS) with preschool children, and the social factors that may influence this variant. The research question is: How do Singapore English-Malay bilingual parents pronounce the L sound in English during child-directed speech (CDS) events? What social conditions influence the pronunciation of L sound by Singapore English-Malay bilingual parents in these events?

2. Methods

2.1. Recruitment criteria and details

The study’s corpus comprised ten Singapore English-Malay bilingual families, consisting of father, mother, and their 3-year-old eldest son; age range 1 to 6; 4 (Mean = 55.8 months, SD = 12.43). Child participants, not yet in primary school, were
bilingual and exposed to both languages since age three. All participants were Singapore-born, and Table 1 displays survey information, including age, age of acquisition (AoA), language advantage, socioeconomic status (SES), and child sex.

**Table 1.** Survey information.

<table>
<thead>
<tr>
<th>Family ID</th>
<th>Age</th>
<th>AoA English</th>
<th>AoA Malay</th>
<th>BLP</th>
<th>SES</th>
<th>Gender of child</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>C</td>
<td>M</td>
<td>F</td>
<td>C</td>
</tr>
<tr>
<td>M6</td>
<td>31</td>
<td>37</td>
<td>5; 1</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>M7</td>
<td>30</td>
<td>32</td>
<td>4; 6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M9</td>
<td>31</td>
<td>32</td>
<td>3; 1</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>M10</td>
<td>29</td>
<td>32</td>
<td>3; 2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M11</td>
<td>36</td>
<td>36</td>
<td>5; 8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M17</td>
<td>35</td>
<td>36</td>
<td>4; 11</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M18</td>
<td>33</td>
<td>35</td>
<td>5; 7</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>M12</td>
<td>35</td>
<td>37</td>
<td>6; 0</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>M13</td>
<td>31</td>
<td>33</td>
<td>3; 8</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>M14</td>
<td>32</td>
<td>34</td>
<td>4; 10</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In Table 1, the age range indicates that the sample includes young parents, the relative balance of English and Malay acquisition histories, differences in the degree of bilingual advantage between families, and clustering around average socioeconomic status.

### 2.2. Instruments and equipment

Adults, aged 29 to 37 (Mean = 32.8 years, SD = 2.41), were simultaneous or early continuous bilinguals, except for the M11 family father who started learning Malay at around age seven. Despite learning Malay late, he has a distinct Malay English accent, influenced by Malay peers in school and friends during military service at 18–19. Adult language advantage was measured using bilingualism, with scores ranging from −218 (Malay advantage) to +218 (English advantage). Mothers had mean BLP score of 45.16 (SD = 47.14, Mdn = 56.81, range = 30.78–127.77), fathers had mean BLP score of 24.64 (SD = 58.78, Mdn = 35.38, range = 32.24–147.66). Socioeconomic status (SES) was assessed using the modified family affluence scale (FAS), with average SES score of 21.5 (SD = 2.63).

The recordings were made in a quiet room, in their respective homes, with minimal reverberation, and no researchers or anyone else other than parents and children were present during each recording. To ensure that the recording quality was good enough for acoustic analysis of fine speech details, they each wore an omnidirectional lapel microphone pinned to their lapel, which was connected to a NAGRA ARES-MII recorder and recorded at 16 bits at a sample rate of 44.1 kHz. The mothers were also given instructions to make sure the recordings were good; If adjustments are needed, they are informed of the optimal position of the microphone and are aware of potential noise that may be generated by activities that affect the recording. Participants were instructed to communicate with their child in their usual manner, avoiding simultaneous talking. Background noise from sources like traffic
and electric fans was minimized.

2.3. Speech data selection and analysis

To avoid co-articulation effects and disyllabic in /l/ pronunciations across morphosyntactic environments, only markers from specific environments were analyzed: a pause or pause before /l/ followed by a vowel (C_V and #_V positions), e.g., look, blue, exclainer; /l/ in a syllable preceded by a vowel and followed by a pause or consonant (V_# and V_C# positions), e.g., ball, called, Pius. Abnormal occurrences of /l/ in SgE were excluded. Tokens with stripping or external noise issues were also excluded. The analysis included a total of 1770 tokens, with the number of markers by parent, form, and syllable position listed in Table 2.

Table 2. Number of marks by parent.

<table>
<thead>
<tr>
<th>Parent</th>
<th>Formal Onset</th>
<th>Formal Coda</th>
<th>Informal Onset</th>
<th>Informal Coda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers</td>
<td>197</td>
<td>509</td>
<td>87</td>
<td>167</td>
</tr>
<tr>
<td>Fathers</td>
<td>195</td>
<td>408</td>
<td>81</td>
<td>126</td>
</tr>
<tr>
<td>Subtotal</td>
<td>392</td>
<td>917</td>
<td>168</td>
<td>293</td>
</tr>
</tbody>
</table>

Table 2 explains the patterns associated with the /l/ token count, mainly including mothers contributing more tokens, especially in the ending position, followed by fathers’ relatively balanced symbols in the syllabic position, larger symbols in general drawn from formal contexts, and the data in the table shows that symbols vary widely between speakers in different contexts.

3. Results of the study

3.1. Influence of language variation on school education

Discrimination and prejudice against dialects are common in school education. In this case, dialect speakers are negatively affected. From a linguistic point of view, different dialects only indicate differences and variations in the use of language elements by different speakers. Dialect is a neutral concept, there is no good or bad. However, in society, and especially in schools, when one language is identified as “standard” and “correct”, the remaining languages become “non-standard” and “substandard”, which increases the risk of discrimination. Teachers may have different impressions of students because of their language. Some teachers will treat students negatively because of their dialect, suspicious of their background and family status. Differences in dialects often mean differences in cultural values. It is easy for teachers to misunderstand these students, which leads to conflicts between teachers and students. The same goes for accents. In Western school education, accent is usually an important criterion for teachers to judge students’ speech ranking. Some teachers have even linked students’ accents to moral language, using words such as “prudent” and “good” to judge those with good pronunciation, and words such as “lazy” and “careless” to judge those with less than good pronunciation. In addition, teachers tend to relate students’ language to their behavior. Most Western teachers believe that there
is a close relationship between “non-standard language” and “bad behavior”, and that those with “non-standard language” are likely to have “bad behavior”.

The existence of dialects increases the workload and difficulty of teachers. First of all, some students are unwilling to learn vocabulary and resist professional vocabulary. This phenomenon is more serious in the lower grades. This resistance may be due to the fact that these students treat a complex, unfamiliar language as a foreign language. These students argue that the use of these supposedly higher foreign languages is essentially a denial of the mother tongue to criticize. In addition, different teachers have different standards for correcting students’ language and speech styles. Different teachers have different ideas about when to start correcting students. This will result in some students being corrected in the lower grades and others not being corrected until the upper grades. Discrimination and prejudice against dialects are common in school education. Dialects only indicate differences and variations, but only bad. However, in society, especially in schools, when a language is seen as “standard” and “correct,” it is often considered “non-standard” and “substandard,” which has led to a change in language. Teachers may have different expectations and behaviors, for example, the language level and learning style of students may be different. In American schools, teachers often assess students’ language ability to determine their achievement in language learning.

Some teachers even allow students to use their own language without teacher guidance. In addition, teachers often communicate the effects of language change to students and encourage them to change their language. Many American teachers believe that language change can be changed, but there are some negative consequences.

When it comes to the influence of dialects on children’s literacy, most scholars believe that children’s language background has no direct relationship with their literacy performance in school. Non-standard language is not the main reason that hinders the improvement of students’ literacy. Dialect and accent have little influence on writing. In terms of spelling, although the pronunciation of regional dialects has some influence on spelling, spelling errors cannot be entirely attributed to accents. Teachers should guide students to view the relationship between standardized spelling and pronunciation correctly (Mahowald et al., 2023).

3.2. Influence of language variation on Western society

When it comes to the influence of language variation on western society, take the influence of accent as an example. Most studies show that people will infer and classify the cultural background and social status of speakers according to language and accent. Different accents usually mean different cultural backgrounds. It is easy to make subjective assumptions about people with different accents, and it is even possible to infer and guess the character and status of the speaker based on the different accents. People’s attitudes towards accents have caught the interest and attention of linguists and psychologists. Studies have shown that people pay more attention to accents than they do to ethnicity. People already have preferences for accents when they are children. Researchers have found that children’s preference for accent is greater than race, and children choose friends based on accents. People begin to judge
each other differently in childhood because of their accents. For example, children can infer information based on tiny clues. Later in childhood, children associate ethnic information with social wealth and social status. This social bias based on accent develops early, and it is an inevitable phenomenon. Accents are used as important cultural reminders and play an important role in people’s cultural identity and categorization, as well as in the perception of human social categorization.

In Western societies, accents can affect people’s social attractiveness. People stereotype accents, and non-native English speakers show a tendency to be influenced by negative stereotypes. Studies have shown that when people feel uncomfortable or have difficulty communicating with someone with a non-native accent, they rate the speaker as less socially attractive.

In terms of the effect of accent on trustworthiness, the accent of a native speaker is more trustworthy than that of a non-native speaker. In terms of influence on social activities, using sales people as an example to discuss the popularity of accents, studies have shown that sales people with standard accents or dialects of their home country tend to be preferred over sales people with other foreign accents. The most influential salespeople are those who have a standard accent in the country. The speaker’s dialect and accent may elicit positive or negative reactions from the crowd. Buyers usually don’t discriminate against or devalue a salesperson’s personal worth. Dialects with high voice quality can even increase buyers’ purchase intention and satisfaction. However, if the sales staff has a very strong local dialect, it may lead to a negative impact on the influence and role of the dialect in the social management, and the dialect can better play the role of supervision workers. Because dialects can increase the attractiveness of the working group and promote friendship among colleagues. The formation of high-quality groups has played a great role in the increase of the company’s turnover. The better a person’s dialect skills, the less likely he is to leave the company. The social identity of the region that dialects add to will increase the organizational identity of the individual. Individual job satisfaction will increase with the increase of organizational identification. The stronger an individual’s dialect skills, the more adaptive they are to organizations and communities. High-quality communities result from high-quality information exchange. Dialects can promote trust and mutual support.

4. Language result analysis

4.1. No L and reserved endings

The proportion of endings /L/ marks that have no L (i.e., sound/delete) and are retained according to the form of parents and situational context is shown in Figure 1. A visual examination of the graph revealed that, overall, both fathers and mothers had the same production pattern: in informal Settings, a larger proportion retained /L/, but in formal settings, there were fewer marks for more /L/. Mixed effects generalized linear regression is used to model binary outcomes for mothers and fathers with no or retained side tails, respectively.

Figure 1 shows the percentage realization of the tail word /L/ as a function of context and parent form.
Fixed linguistic factors include adjacent consonants (coronal, glottic, labial, lingual membrane, glissando, or pause), lexical stress (stressed/unstressed), and categorical variables for vowel height and vowel advancement in front vowels. SgE has a greatly reduced number of vowels compared to standard Southern English; Phonemic length and number distinctions are lacking in tense-lax pairs (e.g., beat and bit are homophones), /æ/ merges with /e/, and /e/ and /o/ are monophthongs represented by [e] and [o], respectively. Diphthongs are classified based on their offset (e.g., /a/ vs. /i/ group). Therefore, vowel height category for [I, u], [e, goes, o], [e, oo and [ʌ], vowel high-level categories for the former [I, e, e], the [goes, ʌ], and [u, o, oo]. Nonverbal or social factors that were incorporated into the fixed influence included form (formal/informal), gender of the child (male/female), age of the child (month), SES score and BLP score. The continuous independent variable is centered on the mean. Two-way interactions were introduced as fixed effects, considering formality interactions with socioeconomic status, BLP, child age, and child sex. To assess the contribution of each predictor, pin-model comparisons are performed using the likelihood ratio test between a complete model that includes all explanatory variables and a more restricted model that excludes the predictions considered.

In the mother’s simplified model, $B = 0.99$, $OR = 0.37$, $p = 0.01$, 95% CI [0.17, 0.81] near the lips and formal $B = 0.84$, $OR = 0.43$, $p = 0.04$, 95% CI [0.20, 0.96] were significant predictors. That is, the side before the lips is more likely to be L-free than before the pause, while the mother’s caudal side is more likely to be L-free in a formal setting. In the simplified model of the father, the slope of the interaction between the form and the age of the child, and the slope of the solution by word between the form and the age of the child, are increased, because the finding of the interaction term as a fixed effect significantly improves the fit of the model in modeling. The influence of adjacent consonants, $B = 1.35$, $OR = 0.26$, $p = 0.001$, 95% CI [0.12, 0.58], and velars, $B = 1.47$, $OR = 0.23$, $p = 0.02$, 95% CI [0.07, 0.79], were significant. Tail to tail before either consonant type is more likely to be L-less than before the pause. The advance of front vowels was also an important predictor; The laterals after the front vowel, $B = 1.57$, $OR = 0.21$, $p < 0.001$, 95% CI [0.09, 0.46], and the laterals after the central
vowel, \( B = 1.63, OR = 0.20, p < 0.001, 95\% CI = [0.09, 0.42] \), are more likely to be /l/-less than those after the back vowel. Examination of the representations of individual vowels reveals that the frequent occurrence of three specific words (all and small) sharing the principal /l/, which are almost always pronounced by the father with the reserved /l/, may be responsible for the significant difference. The interaction between formality and child age was a significant predictor \((B = 0.07, OR = 1.07, p = 0.02, 95\% CI [1.01, 1.14])\). A spotlight analysis was conducted to assess the variation in formality and position across three levels of the child’s age: average, mean +1 SD, and mean −1 SD. Based on marginal mean plots and simple effect estimates, more /l/-free markers are produced in formal Settings than in informal Settings as age declines, and only for younger age groups, and the contrast is significant \((OR = 0.31, p = 0.02)\).

Paired comparisons (Tukey adjustments) of age levels based on situational settings (e.g., older and younger people in informal settings) show that the difference between age levels is not significant \((p > 0.1)\). An examination of the individual’s raw data did show that the two youngest children, 1) and M10 (3; 2) fathers, in formal cases, produce a fairly high proportion of /l/-free marks, but the next youngest child Mi1 (3; 8) The increase in fathers using /l/-free markers was small. In summary, considering language, mothers generally produced more /l/-free markers in formal settings, whereas only some fathers with very young children exhibited this behavior.

### 4.2. The dark degree of the lateral consonant

The following analysis includes only the starting and ending laterals marked as reserved. Firstly, the change of dark degree of collateral branches was studied by drawing the bark transform \( F1 \) value and its \( F2 \) graph. The percentage of the tail word /l/ realized as a function of the context of the situation and the form of the parent word. J.H. in the Journal of Phonetics 101,084 values (Figure 2). Reiterating, clearer /l/ is linked to higher \( F2 \) values and lower \( F1 \) values. The plot includes observations grouped by context based on form and syllable position, along with ellipses depicting their distribution at ±1 standard deviation. To reveal potential sex differences, profiles of fathers and mothers were also drawn separately. The figure shows that fathers and mothers exhibit different vocal patterns. The father’s side apostrophe (top row) is combined in all four cases, indicating that there is little difference between the /l/ allophones depending on the situation or positional context. In contrast, for mothers (bottom row), many of the ending /l/ markers are darker than all other /l/ markers in formal contexts. In informal settings, mothers show a similar /l/ pattern as fathers, but in formal settings, many final /l/ markers become darker. This reflects that speakers of more mature standard varieties of English exhibit clearer opening and darker ending patterns. Large ellipses imply that not all /l/ representations become darker in formal contexts, indicating potential interlingual variation or common linguistic effects.

Further investigation into peak-to-peak variation in mothers involved visual examination of individual scatter plots. Six mothers clearly distinguished between onset and end /l/ in formal context, while M10 and M17 only partially distinguished. M6 and Mi1, with the lowest BLP scores, had difficulty distinguishing all sides in the dark, suggesting language advantage may impact their representations.

As a function of the form, syllable position, and parent of the situational context,
the ellipse was ± 1 standard deviation and the average $F_2-F_1$ (Bark) was used (recall that the greater the difference, the clearer /l/). The ellipse was drawn according to the form, parent, and syllable position, and the dark of the side sounds was further visually examined (Figure 2). For fathers, there was little difference in the mean $F_2-F_1$ (Bark) values of morbidity and coda in informal settings. In an informal context, the beginning /l/ has the meaning 6.97 ($SD = 1.21$, $n = 81$) and the end /l/ has the meaning 6.95 ($SD = 1.06$, $n = 82$). In form, the ending /l/ is slightly dark; The mean value was 6.76 ($SD = 1.22$, $n = 200$) and 7.03 ($SD = 1.19$, $n = 194$) at onset, with a mean difference of 0.27 Bark. In contrast, mothers used a darker /l/ for formal occasions. The average value of the onset /l/ was 8.02 ($SD = 1.50$, $n = 197$), while the average value of the end /l/ was 5.78 ($SD = 1.93$, $n = 163$), resulting in an average difference of 2.24 Bark. Interestingly, in informal settings, mothers’ onset /l/ is darker than in formal settings, and the ending /l/ is slightly clearer than the onset /l/. The mean of onset /l/ was 7.35 ($SD = 1.22$, $n = 87$), and the mean of ending /l/ was 7.64 ($SD = 1.51$, $n = 92$).

Figure 2. Syllabic position form diagram of father and mother.

A mixed-effects linear regression analysis was conducted to explore the relationship between side blackness and various potential predictors. The response variable is the $F_2-F_1$ value of the Bark transform. Random effects include random intercepts for themes and words, as well as random slopes for themes and words with respect to form, location, and parents. The fixed effects in the complete model are categorized and encompass the form of the situational context (formal/informal), parents (mother/father), syllable position (beginning/end), lexical stress (stressed/unstressed), adjacent consonants (coronal, glottal, labial, palatal, glissando, or pause), and the sex of the child (male/female). Continuous fixed effects include $F_2$ (Bark) labeled by adjacent vowels at 30 ms, duration of lateral sounds, BLP score, SES score, and age of the child. Finally, the ternary interaction between form, parent word and syllable position are added. A logarithmic transformation of the transverse duration is performed to resolve the skewness of the data. Parents’ age of acquisition was measured in the BLP survey, so it was not added as a separate variable to avoid multicollinearity problems. The continuous independent variable is centered on the mean. Using the process outlined in Zuur et al. (2009), a series of models were fitted for model selection. All of the explanatory variables above are initially included in a complete model. Initially, a likelihood ratio test with a restricted maximum likelihood (REML) estimate is employed to assess the optimal random effect structure in the full
model. Subsequently, through maximum likelihood (ML) estimation, the best fixed-effect structure with the chosen random effect is evaluated by sequentially removing fixed factors, utilizing the Akaike information criteria as a measure of model fit. Finally, a simplified model is provided using REML estimation.

**Table 3.** Regression coefficient of the fitting function.

<table>
<thead>
<tr>
<th>Fixed factors</th>
<th>Level</th>
<th>β</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td></td>
<td>0.12</td>
<td>7.22</td>
<td>0.18</td>
<td>40.01</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Formality</td>
<td>Formal</td>
<td>0.02</td>
<td>0.03</td>
<td>0.19</td>
<td>0.14</td>
<td>0.89</td>
</tr>
<tr>
<td>Position</td>
<td>Coda</td>
<td>0.02</td>
<td>0.03</td>
<td>0.24</td>
<td>0.12</td>
<td>0.90</td>
</tr>
<tr>
<td>Vowel context</td>
<td></td>
<td>0.48</td>
<td>0.39</td>
<td>0.03</td>
<td>15.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neighbouring consonant</td>
<td>Coronal</td>
<td>0.04</td>
<td>0.06</td>
<td>0.10</td>
<td>0.60</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>Glottal</td>
<td>0.01</td>
<td>0.01</td>
<td>0.22</td>
<td>0.05</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Labial</td>
<td>−0.30</td>
<td>−0.46</td>
<td>0.13</td>
<td>−3.60</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Glides</td>
<td>0.19</td>
<td>0.30</td>
<td>0.21</td>
<td>1.43</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>Velar</td>
<td>−0.15</td>
<td>−0.24</td>
<td>0.17</td>
<td>−1.43</td>
<td>0.15</td>
</tr>
<tr>
<td>Parent</td>
<td>Mothers</td>
<td>0.09</td>
<td>0.14</td>
<td>0.24</td>
<td>0.60</td>
<td>0.55</td>
</tr>
<tr>
<td>Formality × Parent</td>
<td></td>
<td>0.17</td>
<td>0.27</td>
<td>0.28</td>
<td>0.99</td>
<td>0.32</td>
</tr>
<tr>
<td>Formality × Position</td>
<td></td>
<td>−0.20</td>
<td>−0.31</td>
<td>0.34</td>
<td>−0.89</td>
<td>0.37</td>
</tr>
<tr>
<td>Parent × Position</td>
<td></td>
<td>−0.22</td>
<td>−0.34</td>
<td>0.34</td>
<td>−0.98</td>
<td>0.33</td>
</tr>
<tr>
<td>Formality × Parent × Position</td>
<td></td>
<td>−0.71</td>
<td>−1.11</td>
<td>0.50</td>
<td>−2.22</td>
<td>0.03</td>
</tr>
</tbody>
</table>

The results for the simplified model are presented in Table 3. The optimal random effects structure for the simplified model comprises random intercepts for topic and word, a random slope for the topic in the two-way interaction between parents and form and position, and a random slope for the word in form, position, and parent. The findings indicate that co-articulation effects of adjacent vowels and consonants, noted in prior studies, are significant predictors of the blackness of lateral sounds in this study. Larger front vowels in the adjacent vowel context contribute to clearer /l/. Adjacent consonants also influence lateral sounds. The ternary interaction between parent, form, and syllable position emerges as a crucial predictor. Insignificance of all two-way interaction terms underscores substantial variability in factor levels without adjustment for the third level. Examination of the marginal mean plot and pairwise comparison of simple effects (graph adjustment) align with observations in Figure 2. In informal settings, no significant differences were found in intra- and inter-maternal and paternal onset caudal darkness and caudal darkness ($p > 0.05$). In formal settings, there was no significant change in the lateral darkness of the mother’s onset ($B = 0.29$, $t = 1.39$, $p = 0.52$), but their caudal tail was significantly darker than the informal tail ($B = 1.12$, $t = 3.74$, $p = 0.006$), and significantly darker than the lateral darkness of the formal onset ($B = 1.73$, $t = 6.00$, $p < 0.001$). Conversely, for the father, there was no significant change in the darkness of the onset and end sides, and the positional contrast between the two situations remained insignificant. Unlike the mother, the father’s tail wave is not significantly darker than the initial wave in a formal setting ($B = 0.28$, $t = 1.13$, $p = 0.68$). Main
effects of child age and sex, BLP, and SES had no significant impact on the degree of darkness in lateral sounds.

5. Discussion

The aim of this study was to understand whether and how bilingual Singapore-English-Malay caregivers vary the use of /l/ variants in CDS of preschoolers based on context, as well as social indicators that might explain the phonetic changes (Khaliq et al., 2023). To remind the reader that in previous studies, the syllable vowel /l/ came in three forms: l-less (pronounced -l or deletion-l, the predominantly native form), dark-l (the variant associated with the explicit standard), and clear-l (the Malay derived variant used by some English-Malay bilinguals). The results showed that in informal Settings involving unstructured play and casual conversation with children, mothers and fathers used the relatively clear /l/ in all syllable positions. In contrast, in formal Settings involving teaching, mothers used significantly darker endings, mirroring the clear endings and darker closing patterns exhibited by speakers of more mature standard English varieties. In addition, mothers used significantly more L-free markers in formal settings (Gadet, 2015). For the father, there was no significant difference in the lateral dark pronunciation according to the context, and the positional contrast remained insignificant. However, some fathers of young children do produce a considerable amount of L-free labeling in formal Settings. In addition to these findings, two linguistic factors were found to significantly predict the likelihood of l pronunciation. First, the prelip ending /l/ (the same is true of the father’s ending) is more likely to be L-less than the ending before the pause. Second, for fathers, the offset after the back vowel is more likely to be retained, but as explained earlier, this effect may be attributed to the high incidence of specific lexical items with/lives/that fathers almost always pronounce with the retained /l/. Two main linguistic factors also predict the dark sound of reserved laterals.

The study reveals that fathers exhibit minimal adjustment in their use of /l/ in child-directed speech (CDS) compared to mothers. Gender differences may be better explained by social forces such as cultural or social norms influencing language choices, as the external/social factors considered in this study are unrelated to gender. Differences in gender roles, particularly within the traditional Malay family’s patriarchal structure, may contribute to these findings. The rigid gender roles persist, with husbands as breadwinners and wives managing the household and assuming the primary caregiver role, despite increased participation of Malay women in the labor market. Qualitative studies highlight role segregation, with women managing household work based on assessments of the husband’s ability or efficiency. In the Malay community, gender roles, including women’s child-rearing responsibilities, have both cultural and religious foundations. Mothers, as role models and language teachers, play a significant role at home. The observed gender difference in the use of the /l/ sound, where mothers use it more than fathers, aligns with the “gender pattern” observed across various cultural and linguistic contexts, where women tend to use more standard variants and are closer to sociolinguistic norms associated with overt prestige. This suggests that the observed gender difference may stem from mothers having a broader overall repertoire than fathers.
6. Conclusion

The study aimed to better understand if, how and why Singapore English Malay bilingual caregivers use the syllable vowel /l/ in child directed speech for preschoolers. Consistent with previous studies involving segmental modification of social conditions among bilinguals and ethnos elective speakers, this study shows how mothers, rather than fathers, alter their /l/ production in CDS based on communicative intentions and underlying social-index associations, and also explores how cultural norms and expectations shape CDS patterns (Mirvahedi and Cavallaro, 2020). The study underscores the linguistic and sociolinguistic complexity of children in language acquisition within multilingual and multicultural contexts. It emphasizes that external factors play a crucial role in the acquisition process. The highly diverse input these children receive, though not necessarily probabilistic, raises questions about how they navigate this complexity and the impact it has on their language development. Further exploration in language acquisition should delve into how these children handle the intricate input they encounter.

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References


