

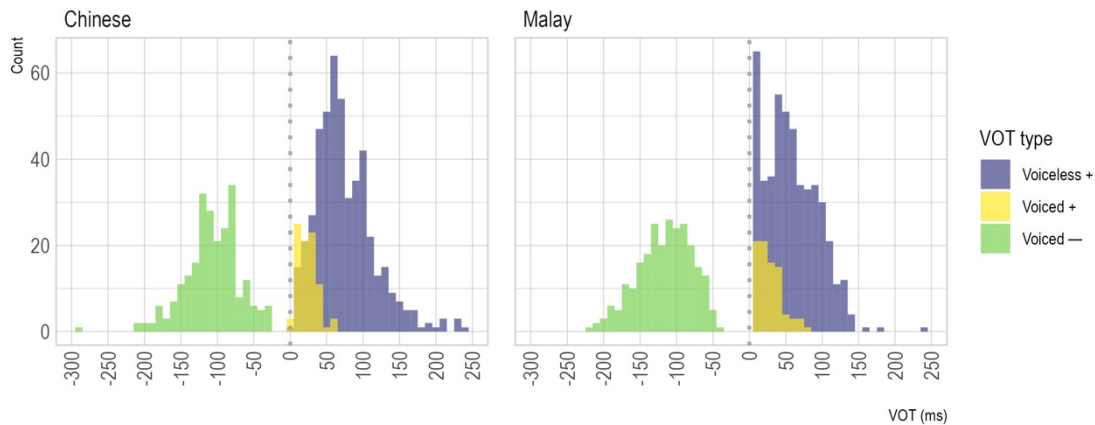
## Variation in English stop voicing contrast in Singaporean Chinese and Malay mothers

The building of phonemic contrasts in children relies on input, but in many contexts input can be particularly varied/variable. Caregivers speaking an L2 may exhibit phonetic characteristics that differ from L1 peers in adult-directed speech (ADS) and in the modifications made in their child-directed speech (CDS)<sup>[1,2]</sup>. Not all variable/differential production is due to acquiring an L2 late<sup>[e.g.,3]</sup>; in multidialectal/multilingual contexts that have undergone long-term language contact/shifts, for instance, early bilinguals may speak a different 2L1/early L2, differ in their language dominance<sup>[4,5]</sup>, or are exposed to differential features from their peers/caregivers<sup>[6,7]</sup>. This study explores such differences in the distribution of voice onset time (VOT) of English word-initial stops in the ADS and CDS of Singaporean caregivers.

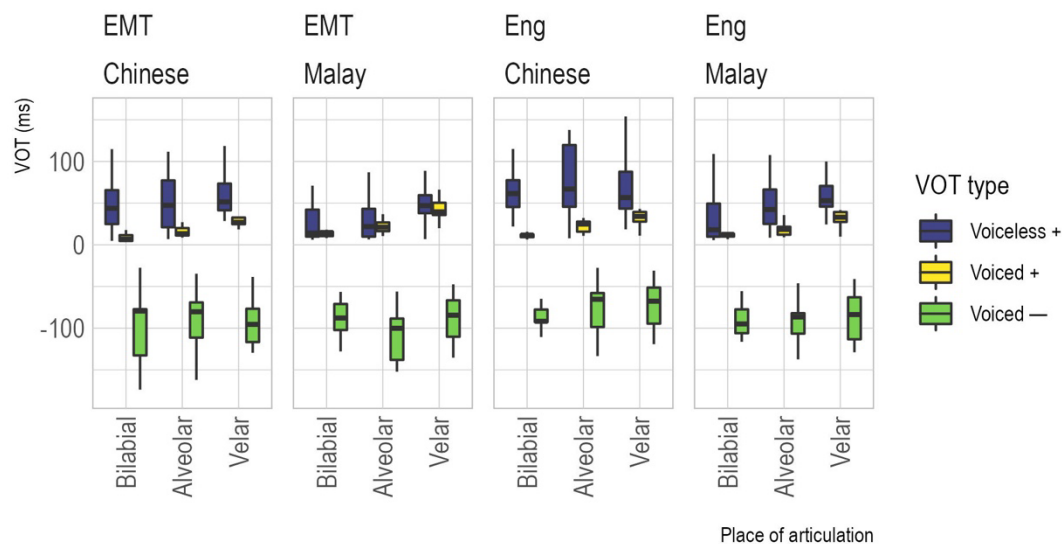
Participants were ten Singaporean Chinese (early English-Mandarin bilinguals) and ten Malay (early English-Malay bilinguals) mothers and their preschoolers (27–73 months). Five mothers of each ethnicity were more dominant in Mandarin/Malay (Bilingual Language Profile [BLP]<sup>[8]</sup> range:–58.66,+20.89), while the others were more dominant in English (BLP:+48.2,+129.7). Target words with word-initial stops (/p,t,k,b,d,g/) preceding close vowels (/i, u/) in ADS were elicited through carrier phrases “*I say\_again*”. The same target words and others with word-initial stops in the same vocalic contexts in CDS were elicited through a picture description task and the reading of a storybook, in a quiet room without the author’s presence. The positive/negative VOT in ADS ( $n=816$ ) and CDS ( $n=786$ ) was analysed acoustically using established methods<sup>[e.g.,1,2]</sup>.

Initial examination revealed bimodal distributions for both ethnic groups (Fig.1); positive/negative VOT was analysed separately using mixed-effects linear regression, with speech rate (vowel duration), place of articulation, child’s age, and phrasal/phonetic contexts controlled for. The analysis of positive VOT revealed that VOT in ADS was longer than CDS. VOT of Malay mothers was shorter than Chinese mothers, but only significantly so in CDS ( $b=-12.27$ ,  $p=0.009$ ) and only for /p,t,k/ ( $b=-14.84$ ,  $p=0.002$ ). VOT of Mandarin/Malay-dominant mothers was shorter than that of English-dominant mothers, but only significantly so for /p,t,k/ ( $b=-11.29$ ,  $p=0.01$ ). In the analysis of negative VOT, VOT was overall more negative in ADS than CDS ( $b=17.20$ ,  $p<0.001$ ). Negative VOT was overall longer for Malays than Chinese ( $b=13.81$ ,  $p=0.026$ ). In sum, although contrast between voiced/voiceless stops was maintained in CDS, Chinese mothers employed longer positive VOT and shorter lead VOT, whereas Malays produced shorter positive VOT but longer lead VOT (Fig.2). These voiced/voiceless contrasts, however, were smaller for Mandarin/Malay-dominant and Malay mothers (Fig.2).

Differences between ethnic groups could partially be explained by the assimilation with and/or influence of the same stops of the other language (Mandarin: long-lag—short-lag; Malay: lead—short-lag)<sup>[9]</sup>, and could also be due to long-term language contact and intergenerational transmission<sup>[e.g.,6]</sup>. That the phonemic contrasts were not greater in CDS may be due to the older children, and the smaller differences between groups in ADS may reflect the socialised tendencies for Singaporeans to approximate a common exonormative standard in their self-conscious speech<sup>[10]</sup>. Results from ongoing analysis on the children’s VOT will be discussed, to understand the influence of such variation in the input on their VOT development.



**Figure 1:** VOT frequency distributions for Chinese (English-Mandarin bilinguals) and Malay (English-Malay bilinguals) mothers' productions of English word-initial stops in both CDS and ADS. The dotted line represents the split between positive and negative VOT at 0 ms. Phonologically voiced stops with positive VOT were analysed together with voiceless stops with Voicing as a predictor.



**Figure 2:** VOT in CDS of Chinese and Malay mothers as a function of language dominance (Mandarin/Malay (EMT)-dominant versus ENGLISH-dominant), VOT type, and place of articulation. For sake of clarity, outliers are not shown in the plot.

- [1] Fish, M. S., García-Sierra, A., Ramírez-Esparza, N., & Kuhl, P. K. (2017). Infant-directed speech in English and Spanish: Assessments of monolingual and bilingual caregiver VOT. *Journal of Phonetics*, 63, 19–34. <https://doi.org/10.1016/j.wocn.2017.04.003>
- [2] Stoehr, A., Benders, T., van Hell, J. G., & Fikkert, P. (2019). Bilingual preschoolers' speech is associated with non-native maternal language input. *Language Learning and Development*, 15(1), 75–100. Scopus. <https://doi.org/10.1080/15475441.2018.1533473>
- [3] Bosch, L., & Ramon-Casas, M. (2011). Variability in vowel production by bilingual speakers: Can input properties hinder the early stabilization of contrastive categories? *Journal of Phonetics*, 39(4), 514–526. <https://doi.org/10.1016/j.wocn.2011.02.001>
- [4] Sharma, D. (2011). Style repertoire and social change in British Asian English. *Journal of Sociolinguistics*, 15(4), 464–492. <https://doi.org/10.1111/j.1467-9841.2011.00503.x>
- [5] Sim, J. H. (2019). "But you don't sound Malay!": Language dominance and variation in the accents of English-Malay bilinguals in Singapore. *English World-Wide*, 40(1), 79–108. <https://doi.org/10.1075/eww.00023.sim>
- [6] Kirkham, S. (2017). Ethnicity and phonetic variation in Sheffield English liquids. *Journal of the International Phonetic Association*, 47(1), 17–35. <https://doi.org/10.1017/S0025100316000268>
- [7] Mayr, R., & Montanari, S. (2015). Cross-linguistic interaction in trilingual phonological development: The role of the input in the acquisition of the voicing contrast. *Journal of Child Language*, 42(5), 1006–1035. <https://doi.org/10.1017/S0305000914000592>
- [8] Birdsong, D., Gertken, L. M., & Amengual, M. (2012). Bilingual Language Profile: An easy-to-use instrument to assess bilingualism. COERLL, University of Texas at Austin. <https://sites.la.utexas.edu/bilingual/>
- [9] Flege, J. E. (2007). Language contact in bilingualism: Phonetic system interactions. In J. Cole, J.I. Hualde (Eds.), *Laboratory phonology*, Vol. 9, Walter de Gruyter, Germany, pp. 353-382
- [10] Sim, J. H. (2022). Negotiating social meanings in a plural society: Social perceptions of variants of /l/ in Singapore English. *Language in Society*, 1–28. <https://doi.org/10.1017/S0047404522000173>