RUNNING HEAD: Multilingual SuperSpeech intervention

SuperSpeech: Multilingual Speech and Language Maintenance Intervention for Vietnamese-Australian Children and Families via Telepractice

Sharynne McLeod
Sarah Verdon
Van H. Tran
Kate Margetson
Cen Wang

Charles Sturt University, Australia

Correspondence: Sharynne McLeod, Ph.D.,
School of Teacher Education, Charles Sturt University, Bathurst, NSW 2795, Australia
Phone: +61 2 6338 4463 Email: smcleod@csu.edu.au

• Sharynne McLeod, Ph.D. https://orcid.org/0000-0002-7279-7851; Twitter: @SharynneMcLeod
• Sarah Verdon, Ph.D. ORCiD: https://orcid.org/0000-0002-7503-5860; Twitter: @SV_SLP
• Van H. Tran, Ph.D. ORCiD: https://orcid.org/0000-0002-8855-9313; Twitter: @VanTranTH
• Kate Margetson ORCiD: https://orcid.org/0000-0002-8203-4428; Twitter: @KateMargetson
• Cen Wang, Ph.D. ORCiD: https://orcid.org/0000-0002-3151-1466; Twitter: @CenAudreyWang

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Abstract

**Purpose.** To evaluate the effectiveness of the group VietSpeech SuperSpeech program targeting speech skills and home language maintenance via telepractice.

**Method.** In Stage 1 of this pilot feasibility study using a case-controlled design, 30 Vietnamese-English-speaking children were assessed in English and Vietnamese and parents completed questionnaires about speech and language competency and practices. During Stage 2, children were allocated to Intervention (n=14) or Control (n=16) conditions. COVID-19 restrictions resulted in changes including non-random allocation. Online group intervention was delivered 1-hour/week for 8 weeks encouraging multilingualism as a superpower. For Stage 3, assessments were undertaken approximately 10 weeks after the pre-intervention assessment.

**Results.** Parents in the Intervention group significantly increased encouragement of their children to speak Vietnamese. The Intervention group significantly increased intelligibility in English. Growth of Vietnamese vocabulary was faster for the Control group. There was a moderate effect of intervention for children’s perception of being happy talking in Vietnamese and English. There was no significant mean change from pre- to post-intervention compared with the Control group for measures of speech sound accuracy in Vietnamese or English, Vietnamese intelligibility, English vocabulary, or hours of Vietnamese spoken each week.

**Conclusions.** This study presents preliminary evidence that this 8-hour online group program targeting speech skills and home language maintenance had some impact on Vietnamese-Australian children’s speech and home language maintenance. Further research involving a randomized trial is warranted.
Key words: multilingual; bilingual; intervention; speech; home language maintenance; Vietnamese; telehealth; telepractice
SuperSpeech: Multilingual speech and language maintenance intervention for Vietnamese-Australian children and families

Many children around the world are multilingual. Despite this, few resources for speech-language pathologists’ (SLPs’) assessment and intervention have been developed for multilingual English-speaking children (Guiberson & Aitkins, 2012; McLeod & Verdon, 2014; Teoh et al., 2018). In English-dominant countries, multilingual children frequently receive support only in English or using adaptations of monolingual English resources (Crowe et al., 2021; Newbury et al., 2020; Williams & McLeod, 2012). To address this paucity in the knowledge and tools available for SLPs’ practice with multilingual children, there is a need for research to develop and implement resources specifically developed for multilingual populations. The purpose of the paper is to document the development of an evidence-based program designed for SLPs to support both speech development and home language maintenance of Vietnamese-Australian children.

Supporting Multilingual Development

Multilingualism is used as an overarching term for bilingualism and multilingualism. “Children who are multilingual are able to comprehend and/or produce two or more languages in oral, manual, or written form with at least a basic level of functional proficiency or use, regardless of the age at which the languages were learned” (International Expert Panel on Multilingual Children’s Speech, 2012). Supporting multilingualism in childhood has been associated with a wide range of positive lifelong impacts upon cognitive, academic, social, emotional and economic outcomes (Adesope et al., 2010; Bialystok, 2011); however, a recent meta-analysis questions the extent of cognitive impact of multilingualism (Lowe et al., 2021).
Specifically, children who are exposed to multiple languages in early childhood have been found to have enhanced social skills and theory of mind, stronger familiar cohesion, connection to culture, and sense of identity (Park & Sarkar, 2007). A nationwide study of Australian census data also found that multilinguals who are proficient speakers of English as well as another language, are more likely to have postgraduate qualifications, full time employment, and have a higher income than monolingual English speakers (Blake et al., 2018). As well as the benefits of multilingualism, it does not negatively impact children’s English speech, language and literacy development (Hambly et al., 2013; McLeod et al., 2016; Nguyen, Shin & Krashen, 2001; Tran et al., 2021a). Children must have a level of competency in all of their languages before all the advantages of multilingualism can be realized (O’Connor et al., 2018).

Families can be unaware of the far-reaching benefits of multilingualism and thus seek advice from speech-language pathologists and other health professionals about whether to raise their children multilingually or whether it is best to focus on the dominant language only (Crowe & McLeod, 2016; Sims & Ellis, 2014). This is particularly the case when children have speech, language and communication needs. Despite the known benefits of multilingualism, including for children with speech and language difficulties (McLeod et al., 2016), multilingual families can be advised by health professionals to cease speaking their home language and focus on the dominant language when their children have communication needs (Crowe & McLeod, 2016).

In order to engage in equitable, rights-based and evidence-based practice, SLPs must support all of the languages spoken by a child (International Expert Panel on Multilingual Children’s Speech, 2012; McLeod, 2018). The Convention on the Rights of the Child (United Nations, 1989) states “The child shall have the right to freedom of expression; this right shall
include freedom to seek, receive and impart information and ideas of all kinds, regardless of
frontiers…” (Article 13) and that “the rights set forth in the present Convention to each child
within their jurisdiction without discrimination of any kind, irrespective of the child’s or his or
her parent’s or legal guardian’s … language …” (Article 2). However, many SLPs report lacking
the confidence and competence to engage in multilingual assessment and intervention
(Guiberson & Aitkins, 2012; Newbury et al., 2020; Williams & McLeod, 2012). As such,
research is needed to develop assessment and intervention protocols and resources that are
specifically designed for multilingual populations and that provide specific guidance for
effective implementation (Crowe et al., 2021).

**Challenges of Supporting Home Language Maintenance**

Despite the cultural and linguistic diversity that exists in English-dominant countries,
multilingual children are becoming predominantly monolingual English users around school
entry (Verdon et al., 2014). This trend of home language loss increases with each generation
since migration and children are often completely monolingual by the third generation (Ninnes,
1996; Veltman, 1983). Home language maintenance refers to continuing use of a home language
across generations. The task of supporting home language maintenance often falls to parents
who, despite a desire to maintain home language, often lack knowledge and skills to support
language maintenance in an English dominant environment (Tran et al., 2021d; Verdon et al.,
2021a). Children also play an important role in home language maintenance as they have the
autonomy to choose which language they prefer to speak (Fillmore, 1991; Tran et al., 2021b). As
such, any intervention provided by SLPs to support home language maintenance and
multilingual development must equip parents with evidence-based strategies for supporting
multilingualism while also appealing to children’s motivation to become and maintain their multilingualism (Verdon et al., 2021a). Researchers have found programs supporting children’s home language maintenance were effective in improving learners’ language proficiency and attitudes towards language learning (Escudero et al., 2020; Juntilla & Ylinen, 2020; Lambacher et al., 2005; Trofimovich et al. 2009).

**Interventions for Multilingual Children’s Speech**

While there is some information about intervention for multilingual children’s speech and language most is small-scaled and larger-scaled research is needed for SLPs to engage in evidence-based practice (Crowe et al., 2021). Multilingual speakers are not simply multiple monolingual speakers existing within one person, but rather, languages overlap within the mind of the multilingual speaker and influence each other. It is important to understand features that are in common between languages and also how languages differ in terms of phonetic inventory, stress, and morphophonemic features. This information enables SLPs to identify whether features of children’s speech are typical for multilingual speakers or are evidence of speech sound disorder (SSD) and to target intervention accordingly. The International Expert Panel on Multilingual Children’s Speech (2021) is finalising a tutorial to provide practical guidance for SLPs undertaking multilingual speech intervention.

**Context of the Current Study**

Australia is a diverse multicultural country, with 47.3% of the population having one or more parents born overseas, and 22.2% speaking a language other than English at home (Australian Bureau of Statistics, 2017). Vietnamese is one of the most commonly spoken languages other than English in countries such as Australia and the US and in the top 21
languages spoken in the world (Australian Bureau of Statistics, 2017; Eberhard et al., 2021; Ryan, 2013). The Vietnamese community in Australia is at a key point in time in terms of the maintenance of their home language as immigrants who arrived in Australia in the post Vietnamese-American war era are entering their third generation since migration, and therefore are at high risk of home language loss (Ninnes, 1996; Veltman, 1983).

The VietSpeech team, funded by the Australian Research Council, have undertaken four studies to support Vietnamese-Australian children’s home language maintenance. Study 1: Language practices and profiles of linguistic multicompetence were documented for 271 Vietnamese-Australian adults (McLeod et al., 2019; Wang et al., 2021) and 151 families were surveyed. Families indicated that Vietnamese-Australian children’s multilingualism is supported by the presence of a family language policy and parents’ positive attitudes towards maintaining Vietnamese at home within English-dominant Australian society (Tran et al., 2021a, 2021b, 2021c). Study 2: Key features of typical multilingual speech development and possible markers of SSD were identified by comparing 139 speech samples from 62 Vietnamese-English-speaking children and 77 adult family members (McLeod, Verdon, Margetson et al., 2021, McLeod, Verdon, Tran et al., 2021). A 3-generational case study has been published demonstrating the complex interaction of ambient phonology, cross-linguistic and dialectal features and maturation, on Vietnamese-Australian children’s speech (McLeod, Margetson et al., 2021). Study 3: International experts in multilingual speech and language development and home language maintenance were interviewed (Verdon et al., 2021a). These studies informed the development of the intervention for Study 4 (the current study) and confirmed the importance of access to
multilingual interventions addressing families’ home language maintenance as well as the specific teaching of speech and language in the home languages.

The overall purpose of the VietSpeech SuperSpeech program was to (1) support Vietnamese-Australian children and their families to maintain their home language, (2) enhance children’s speech skills in Vietnamese and English, and (3) equip SLPs to support multilingual children’s speech and language acquisition. The VietSpeech research is underpinned by two key theoretical approaches. The emergence approach to speech acquisition (Davis & Bedore, 2013) was used to conceptualize the speech components of the program, while the theory of linguistic multi-competence (Cook, 2016) was used to frame the home language maintenance components of the program. Study 4 of the VietSpeech research originally was designed as a face-to-face intervention using a randomized controlled design; however, it was adapted to a pilot feasibility study using a case-controlled design using telepractice to accommodate COVID-19 restrictions in Australia.

Aims

This paper describes the impact of the VietSpeech SuperSpeech speech and home language maintenance program with young Vietnamese-Australian children and families by answering the following research questions:

1. What is the impact of participating in the VietSpeech SuperSpeech program on Vietnamese-Australian children’s speech (intelligibility and accuracy of speech sounds in Vietnamese and English) and language (Vietnamese and English vocabulary)?
2. What is the impact of participating in the VietSpeech SuperSpeech program on Vietnamese-Australian children’s attitudes towards their home languages (children’s indication of how happy they are talking in Vietnamese and English)?

3. What is the impact of participating in the VietSpeech SuperSpeech program on Vietnamese-Australian families’ practices regarding home language maintenance (number of hours of Vietnamese spoken each week and parental encouragement of their children to speak Vietnamese)?

It was hypothesized that compared with the Control group, the Intervention group would exhibit an increase in the children’s intelligibility, speech sound accuracy, vocabulary, and positive attitudes towards their home languages as well as in the families’ practices regarding home language maintenance.

Method

Ethics

The Charles Sturt University Human Research Ethics Committee gave approval (H18084) to undertake the research. Potential adult participants were invited to provide written consent and potential child participants were invited to provide assent after hearing a child-friendly description of the research. Information, consent, and assent forms and discussions were available in Vietnamese and English.

Participant Recruitment and Eligibility

Eligibility

Eligible participants were families with Vietnamese heritage with children who were 4 to 6 years of age, living in Australia, and available for a 1.5-hour pre-assessment and 1.5-hour post-
assessment. Eligible participants for the intervention group also had to be available to attend 8 x 1-hour weekly sessions held between October and December 2020 on Thursdays from 5pm to 6pm. Vietnamese-Australian children were included regardless of their level of exposure to each language, or their speech and language ability in either language. Participant flow for this pilot feasibility study using a case-controlled design is described in Figure 1.

**Control Group**

Control participants were identified by inviting 39 children who were consecutively assessed in Study 2 of the VietSpeech Study. Families were initially recruited via social media and snowballing. At the completion of their speech and language assessment the parents were asked if their child was available to undertake a post-intervention assessment in 10 weeks’ time. Agreement was achieved from all 39 families at pre-intervention assessment; however, at the time of the post-intervention assessment families of 13 children were unavailable and families of four children declined to participate. Six children did not meet inclusion criteria for the intervention study because they did not speak Vietnamese as their first or second language or could not complete more than a few words during the speech assessments. Therefore, a total of 16 children completed the post-intervention assessment, of whom thirteen were face to face and three were online due to COVID-19 restrictions (Figure 1).

**Intervention Group**

Intervention participants for the study were invited to contact the VietSpeech research team through social media, including the Vietnamese Parent Association’s Facebook page (> 4,000 members in 2018). Twenty-five families contacted the VietSpeech team, were provided with multilingual English-Vietnamese information and consent forms, and met the inclusion
criteria. Ten families did not complete the paperwork and one was unavailable. Therefore 14 children attended the pre-intervention assessment and were allocated to the intervention condition. All children began the intervention, but one discontinued after week 6 (of 8) due to illness. Thirteen children completed the post-intervention assessment (Figure 1).

**Participants**

**Control Group**

Participants in the Control group were 16 children ranging in age from 2;0 to 7;10 years;months ($M = 61.88$ months; $SD = 25.52$) (Table 1). There were seven males and nine females. The participants lived in Sydney, Australia in suburbs that ranged from the second most disadvantaged (2nd decile) to most advantaged (10th decile) according to the Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD, Australian Bureau of Statistics, 2018). The mean IRSAD decile of participants was 6.88 which is slightly above average socio-economic status. The participants included those who were typically developing as well as those with suspected SSD. Some parents had concerns (yes + a little) about their children’s talking and making speech sounds ($n = 7$, 43.75%) and understanding ($n = 4$, 25.00%). At the beginning of the study, the Control group participants’ average percentage of standard consonants correct (PCC-S) for Australian English was 79.74% ($SD = 22.07\%$, range = 23.67%-97.58%). Their percentage of standard consonants correct (PCC-S) for Vietnamese was 66.91% ($SD = 9.47\%$, range = 54.74% - 83.21%), and their percentage of dialect consonants correct (PCC-D) for

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1 The target pronunciation used for percentage of standard consonants correct (PCC-S) was Standard Australian English as defined on the Diagnostic Evaluation of Articulation and Phonology (DEAP, Dodd et al., 2002) score form. The target pronunciation used for percentage of dialect consonants correct (PCC-D)
Vietnamese was 85.19% \((SD = 9.52\text{\%}, \text{range} = 70.68\%-98.54\%)\). The Control group participants’ average scores on the Intelligibility in Context Scale (ICS, McLeod et al., 2012) for Vietnamese was 3.67/5 \((SD = 1.31, \text{range} = 1.00\text{-}5.00)\) and for English was 4.39/5 \((SD = 0.72, \text{range} = 3.00\text{-}5.00)\). Children’s feelings about talking were measured using the Speech Participation and Activity Assessment of Children (SPAA-C) (McLeod, 2004) and for Vietnamese was 2.27/3 \((SD = 1.03, \text{range} = 0.00\text{-}3.00)\) and for English was 2.80/3 \((SD = 0.41, \text{range} = 2.00\text{-}3.00)\). The average percentage of weekly Vietnamese exposure for participants in the Control group was 51.52% \((SD = 23.70\text{\%}, \text{range} = 0.00\%-100.00\%)\). See Table 1 for further information about children in the Control group. A total of 24 adults who were the family (i.e., mother, father, grandmother, grandfather and aunt) of the children in the Control group completed the parent questionnaire. The majority of the adults were first generation immigrants (78.26\%), reported Vietnamese as their first language (79.17\%) and, on average, had lived in Australia for 16.35 years \((SD = 20.68, \text{range} = 0.00\text{-}92.00)\). There was no significant difference between the children in the Control and Intervention groups for measures relating to their demographics, speech, language, feelings, or language environment (Table 1).

**Intervention Group**

Participants in the intervention group were 14 children ranging in age from 3;10 to 6;7 \((M = 59.93 \text{ months}; SD = 10.51)\) (Table 1). There were seven males and seven females. The participants lived in Sydney and Melbourne, Australia in a range of suburbs from the most disadvantaged (1st decile) to most advantaged (10th decile) according to the Australian Index of

D) was Standard, Northern, Central, or Southern Vietnamese as defined on the Vietnamese Speech Assessment (VSA, Phạm et al., 2016) score form.
Relative Socioeconomic Advantage and Disadvantage (IRSAD). The mean IRSAD decile of participants was 7.50 which is slightly above average socio-economic status. Similar to the Control group, the participants included those who were typically developing as well as those with suspected SSD, as the intervention was open to any Vietnamese-Australian families wanting to know how to support their children’s home language maintenance and speech development. Some parents had concerns \textit{(yes + a little)} about their children’s talking and making speech sounds \((n = 5, 35.72\%)\) and understanding \((n = 2, 14.29\%)\). Before intervention, the Intervention group participants’ average PCC-S for Vietnamese was 71.95\% \((SD = 7.45\%, \text{range} = 50.00\%-81.02\%)\), PCC-D for Vietnamese was 86.23\% \((SD = 11.87\%, \text{range}, 50.00\%-99.27\%)\) and for English was 85.37\% \((SD = 7.60\%, \text{range}, 72.95\%-99.03\%)\). The Intervention group participants’ average scores on the ICS for Vietnamese were 3.77/5 \((SD = 1.08, \text{range}, 1.00\text{-}5.00)\) and for English was 4.27/5 \((SD = 0.79, \text{range}, 2.14\text{-}5.00)\). Children’s feelings about talking for Vietnamese was 1.29/3 \((SD = 0.91, \text{range}, 0.00\text{-}3.00)\) and for English was 2.36/3 \((SD = 0.93, \text{range}, 1.00\text{-}3.00)\) on the SPAA-C \cite{McLeod2004}. The average percentage of weekly Vietnamese exposure for participants in the Intervention group was 43.93\% \((SD = 27.72\%, \text{range}, 0.00\%-93.02\%)\). A total of 19 adults who were the parents \(\text{i.e., mother or father; no other family members completed the questionnaire}\) of the children in the Intervention group completed the parent questionnaire. The majority of the adults were first generation immigrants \(89.47\%\), reported Vietnamese as their first language \(89.47\%\) and, on average, had lived in Australia for 13.89 years \((SD = 12.45, \text{range} = 3.00\text{-}54.00)\).

\textbf{Measures}

\textit{Outcome Measures}
The parents completed questionnaires (in Vietnamese or English) addressing information about their child, the parents, and their family language policy. Vietnamese responses were translated into English by the VietSpeech team member who was a linguist and accredited Vietnamese-English translator. Speech production of the children was assessed in English and Vietnamese and the children responded to questions about how they perceived their talking in each language. Fourteen outcome measures were collected at the pre- and post-intervention assessments (Table 2). Children’s speech production was assessed by considering (1) percentage of Vietnamese consonants correct on the Vietnamese Speech Assessment (VSA, Phạm et al., 2016) and (2) percentage of English consonants correct on the Diagnostic Evaluation of Articulation and Phonology (DEAP, Dodd et al., 2002). Children’s (3) intelligibility in Vietnamese and (4) intelligibility in English were measured based on parents’ averaged responses on the 7-item Intelligibility in Context Scale (ICS, McLeod et al., 2012). The ICS has been validated in 14 languages (including English and Vietnamese) (McLeod, 2020). Children’s language production was measured by recording parents’ responses to the questions “How well does your child (5) speak and (6) understand Vietnamese in their daily life?” with the response options of very well, well, average, not well, not at all. Children’s language production was also measured using the amount of (7) Vietnamese vocabulary and (8) English vocabulary used by the child based on parents’ responses on the Inventory to Assess Language Knowledge (ITALK, Peña et al., 2018) (translated into Vietnamese with permission from the publishers) and (9) the number of words spontaneously named on the VSA during testing. For children’s perception of talking, children’s (10) perception of their own talking in Vietnamese and (11) English was measured by children’s response to the question “How do you feel about the way you talk” from
the Speech Participation and Activity Assessment of Children (SPAA-C) (McLeod, 2004). To respond, the participants were provided with the following five emojis 😊 - 😊 - 😊 - 😊 - 😊 . A 😊 happy response was scored as 3; a 😊 in the middle response was scored as 2; a response of “don’t know/struggling/bored” was scored as 1; and a 😊 sad response was scored as 0. If the child circled O another feeling and gave a synonym for 😊 happy (e.g., “great”) this also was coded as a 😊 happy response. Finally, the family’s Vietnamese language environment was considered by determining (12) the number of hours each week the child hears Vietnamese (based on the parents completing a weekly Exposure Table from Buac et al., 2014), (13) “How often do you encourage your children to speak Vietnamese at home?” with the response options of never, rarely, sometimes, often, always, and (14) “Does your family have a language policy or set of rules around which languages are used by your family in different places and situations?” with the response options of yes, no. Additional information about these measures can be found in the description of VietSpeech Study 2 (McLeod, Verdon, Margetson et al., 2021; McLeod, Verdon, Tran et al., 2021).

**VietSpeech SuperSpeech Intervention**

The VietSpeech SuperSpeech intervention comprised eight online group sessions via Zoom. Each session addressed multilingual speech and language skills and ways that families could support their child’s maintenance of Vietnamese at home. The program was designed to provide activities that could be undertaken with both children and their families together as a group during each 1-hour session. The hour incorporated children’s multilingual activities targeting Vietnamese and English vocabulary (word superpower), speech sounds (speech superpower), and parent training in home language maintenance strategies. The SuperSpeech
program was created based on reviewing literature (e.g., Phạm & McLeod, 2016) and the results from Stages 1 to 3 of the VietSpeech research. The activities targeting vocabulary and speech sounds borrowed from three intervention approaches: Integrated Phonological Awareness Intervention (McNeill & Gillon, 2021) by simultaneously targeting speech production, phonological awareness and letter-sound knowledge; Core Vocabulary Intervention (Crosbie, Holm & Dodd, 2021) by targeting functional words that are difficult to produce consistently; and Enhanced Milieu Teaching With Phonological Emphasis (Scherer, Kaiser & Frey, 2021) by focusing on vocabulary and speech sounds within naturalistic conversation between family members. Every session had a different theme (e.g., food) but followed the same structure (Appendix A). Homework tasks focused on Vietnamese-English book reading, communicating in Vietnamese during daily routines, and specific activities to practice target vocabulary and speech sounds using the resources provided (Appendix B). Three workbooks were created to accompany the VietSpeech SuperSpeech program (Margetson et al., 2020; McLeod et al., 2020; Verdon et al., 2020). For access details see the VietSpeech website https://www.csu.edu.au/research/vietspeech/overview.

**Procedure**

The VietSpeech SuperSpeech team included three Australian English-speaking speech-language pathologists, a Vietnamese-English-speaking linguist, two Vietnamese-English-speaking speech-language pathologists and a Mandarin (Putonghua)-English-speaking psychologist. Typically, assessments were undertaken by two VietSpeech team members (at least one spoke Vietnamese and English). Online intervention was typically undertaken with four or five team members (Figure 2a).
**Stage 1: Pre-Assessment**

Families who confirmed that they were willing to participate in the VietSpeech Study were emailed English and Vietnamese versions of information, consent forms, and questionnaires about the child, parents, and their family language policy. Some families required hard copies of these documents and multilingual assistance was provided by the Vietnamese-English-speaking linguist. After the completed forms and questionnaires were received, the families were contacted by phone, email and/or text to confirm the pre-intervention assessment time and place. Assessments were undertaken in the children’s homes, a Vietnamese language school, or online (when COVID-19 restrictions were in place) (Figure 1). Children’s speech was assessed using the Diagnostic Evaluation of Articulation and Phonology (DEAP, Dodd et al., 2002) in English and the Vietnamese Speech Assessment (VSA, Phàm et al., 2016). Parents were interviewed about their home language maintenance practices. The pre- and post-intervention assessment sessions took approximately 60-90 minutes with breaks for participants who required them. Video and audio recording was completed for tasks using a Zoom H1 Handy Recorder and a Zoom Q4n Handy Video Recorder. Online assessments were recorded using the online software (Zoom). Online broad impressionistic transcription of the Diagnostic Evaluation of Articulation and Phonology (DEAP, Dodd et al., 2002) in English and the Vietnamese Speech Assessment (VSA, Phàm et al., 2016) was completed and later checked by the assessors for accuracy based on the recordings. Their transcriptions were later compared, with disagreements reviewed on the recordings together to reach consensus (see Margetson et al., 2021). Parent interviews were conducted in Vietnamese by the member of the VietSpeech SuperSpeech team,
who was an accredited Vietnamese English translator. The interviews addressed language maintenance, and children’s speech and language.

**Stage 2: Intervention**

**Preparation.** Prior to intervention, packages were mailed to all participating families (Appendix B). These packages that included Vietnamese-English story books, multilingual cards, superhero capes, stationery, craft materials, the VietSpeech SuperSpeech Children’s Workbook (Margetson et al., 2020) and VietSpeech SuperSpeech Family Workbook (Verdon et al., 2020). The VietSpeech team met each week to discuss the content, activities, and the roles of each instructor. The team would debrief about the previous week’s session and revise the next session accordingly. The team also met briefly before each session. The sessions were scheduled from 5pm to 6pm on Thursday afternoons with the same Zoom link for every week. An email written in Vietnamese and English was sent to the Intervention group families every week before the session to remind them of homework activities, the session time, and URL link. The email also included Tips of the Week (i.e., 3-5 tips to help parents support their children’s speech and language development and home language maintenance). Prior to the weekly sessions, families sent their homework via email and the photographs of their work were compiled into a PowerPoint to show to everyone at the beginning of each online session. Information about the URL for the Zoom sessions was sent to the families via emails and text messages prior to the intervention.

**Session activities.** Four VietSpeech SuperSpeech team members were present during all the sessions on a different Zoom screen (Figure 1a) to enable them to host break-out rooms for the children’s activities. All 14 families were online simultaneously (Figure 2b). The language(s)
used in the sessions was guided by information from the questionnaires about the children and parents’ English and Vietnamese proficiency in speaking, listening, reading and writing. The children were present with at least one parent; however, often many family members participated (Appendix A). The sessions began with Vietnamese and English greetings (“Hello” and “Xin chào”) and everyone singing along to the video song “Tiếng chào theo em” (Greetings). The PowerPoint of the families’ weekly homework was presented followed by a quick review of the previous week’s content. The children’s activities continued for 30-35 minutes either as a whole group or in small groups in break-out rooms led by different team members. Activities focussed on vocabulary (word superpower) and speech sounds (speech superpower). Word superpower activities addressed target words or sentences in both Vietnamese and English. Speech superpower activities addressed consonants, tones, and syllable structures in Vietnamese and English, and whether the sounds were the same (i.e., occur in both languages and produced in the same way), different (i.e., occur in both languages but produced differently such as aspirated or unaspirated plosives) or only occurred in one of the languages. In the remaining ten minutes, the VietSpeech SuperSpeech team presented information about home language maintenance to the parents and the children would either have free time or complete the Child Workbook activities independently. The parents’ session followed the Family Workbook and was presented orally in English with the pages from the Family Workbook displayed in Vietnamese, followed by discussion and question time in Vietnamese and English. Each session concluded with guidance regarding homework. During the week, a bilingual English-Vietnamese email was sent to the families to remind them of homework activities, highlight 3-5 tips of the week, and remind them of the Zoom URL link and time for the next week’s session. The families replied to the email
sending photographs of their homework which were compiled into a PowerPoint and shown at the start of the next session.

**Stage 3: Post-Assessment**

The children’s post-assessments were conducted approximately 10 weeks after the pre-assessment for the Control group (who were not offered intervention) and when the intervention had finished for the Intervention group. Post-assessments were the same as the pre-assessments; however, the number of children who were assessed face-to-face and online differed due to COVID-19 restrictions (Figure 1). Parent interviews were conducted in Vietnamese by a bilingual research assistant, who was not a member of the SuperSpeech team. The interviews addressed language maintenance, and children’s speech and language, and the Intervention group provided feedback on the VietSpeech SuperSpeech program.

**Reliability**

Transcription of 10 child participants’ English consonants achieved 92.62% *inter-rater* agreement (6,210 consonants by three VietSpeech team members) and 94.10% *intra-rater* agreement (2,067 consonants by one rater 8 months apart). Transcription of 10 child participants’ Vietnamese consonants achieved 86.57% *inter-rater* agreement (5,480 consonants by four raters) and 88.32% *intra-rater* agreement (1,370 consonants by one rater 8 months apart). Vietnamese was more complex to transcribe than English because there were a number of acceptable “correct” productions for consonants depending on the dialect spoken. The VietSpeech Multilingual Transcription Protocol for impressionistic transcription training, reliability, and consensus checking is described by Margetson et al. (2021) and was informed by studies of transcribing Vietnamese (Masso et al., 2020; Phạm & McLeod, 2016, 2019). These ratings are
consistent with recommended agreement levels for impressionistic transcription (Shriberg & Lof, 1991).

**Data Analysis**

The effect of the VietSpeech SuperSpeech program on children’s speech production, language production, perception of talking and the family’s Vietnamese language environment was examined through the 3-stage pilot feasibility study using a case-controlled design which comprised two groups (Intervention, Control) with data collected at two time points (pre- and post-intervention assessment; Stage 1 and Stage 3). One-way Analysis of Covariance (ANCOVA) was conducted to examine the effect of the SuperSpeech program on the continuous outcome variables of interest at the post-intervention assessment after controlling for their baseline scores. Data for two of the language environment outcome variables, namely the frequency of parents encouraging children to speak Vietnamese at home and the presence of a family language policy, were only collected for the Intervention group at the pre- and post-intervention assessments. As such, a paired-sample t-test was conducted to evaluate whether the intervention had an effect on parents’ efforts to encourage children’s Vietnamese language use at home and a McNemar’s test was conducted to investigate if there was a change in the proportion of the sample having or not having family a language policy pre- and post-intervention assessments.

The assumptions of normality, linearity, independence of the covariate and treatment effect, homogeneity of regression slopes, and homogeneity of variance were assessed, and alternative analyses were conducted where necessary to address the violation of assumptions. In cases where the assumption of normality in the continuous outcome variable was violated,
Quade’s Rank ANCOVAs (Quade, 1967) was conducted. In cases where the assumption of homogeneity of regression slopes was violated, a regression analysis model was conducted where the variability in regression slopes was explicitly modelled by creating an interaction term between the intervention status and baseline score.

Effect size was indicated using partial-eta squared for ANCOVA analyses, with values of .01, .06, and .14 as benchmarks for small, medium, and large effect sizes respectively. For paired sample t-test, effect size was quantified using Cohen’s $d$, with values of .2, .5 and .8 as thresholds for small, medium and large effects respectively (Pallant, 2016). It is important to note that the absence of statistical significance does not necessarily mean that an effect does not have importance in practical terms (Field, 2013); therefore, effect size measures also were taken into consideration.

A qualitative inductive thematic analysis was undertaken of pre- and post-program parent interviews and parents’ feedback via emails and is documented in Verdon et al. (2021b). The analysis identified (a) parents’ motivations, enjoyment, and challenges before and after the program (b) impacts on children’s attitudes, language use and proficiency as well as (c) impacts on parents’ knowledge and language practices. Some representative quotes have been included in the current paper to provide a complete understanding of the outcomes of the study.

Results

Effectiveness of the VietSpeech SuperSpeech Program

A total of 30 participants were eligible for the study and were assigned into two groups (Figure 1): 16 in the Control group and 14 in the Intervention group. The two groups were similar: there were no statistically significant differences in age, sex, socio-economic status, and
all baseline scores for outcome variables of interest (Table 1). For the Intervention group, the average number of participants attending each weekly session was 28 with a range of 23 to 32 ($M = 13$ children, $M = 10$ mothers, $M = 3$ fathers, and $M = 3$ siblings).

**Speech Production.**

*Percentage of Vietnamese Dialect Consonants Correct on the Vietnamese Speech Assessment (VSA, Pham et al., 2016).* After controlling for the effect of the pre-intervention assessment baseline VSA PCC-D score, there was no statistically significant difference between the Intervention and Control groups on post-intervention VSA PCC-D score, $F(1, 25) = 0.42, p = 0.52, \eta^2_p=0.02$.

*Percentage of English Consonants Correct on the Diagnostic Evaluation of Articulation and Phonology (DEAP, Dodd et al., 2002).* Analysis using the Quade’s Rank ANCOVA was conducted to address the violation of the assumption of normality for DEAP PCC-S. The results indicated that after adjusting for the pre-intervention assessment DEAP PCC-S score, there was no statistically significant difference between the Intervention and Control groups on post-intervention DEAP PCC-S, $F(1, 26) = 0.53, p = 0.47, \eta^2_p=0.02$.

*Children’s Vietnamese Intelligibility on the Intelligibility in Context Scale (ICS, McLeod et al., 2012).* There was no statistically significant difference on children’s Vietnamese intelligibility at post-intervention between the Intervention and Control groups, after controlling for children’s Vietnamese intelligibility at pre-intervention assessment, $F(1, 20) = 1.34, p = 0.26, \eta^2_p=0.06$.

*Children’s English Intelligibility on the ICS (McLeod et al., 2012).* After adjusting for children’s baseline English intelligibility, children in the Intervention group scored statistically
higher in English intelligibility compared to children in the Control group at post-intervention, $F(1, 25) = 7.79, p = 0.01, \eta_p^2=0.24$. The large effect size in addition to the statistical significance indicated important practice implications.

**Language Production.**

*Vietnamese Language Proficiency (Speaking).* There was no statistically significant difference on children’s Vietnamese language proficiency (speaking) at post-intervention between the Intervention and Control groups, after controlling for their baseline score, $F(1, 24) = 1.15, p = 0.29, \eta_p^2=0.05$.

*Vietnamese Language Proficiency (Understanding).* There was no statistically significant difference on children’s Vietnamese language proficiency (understanding) at post-intervention between the Intervention and Control groups, after controlling for their baseline score, $F(1, 25) = 0.26, p = 0.61, \eta_p^2=0.01$.

*Vietnamese Vocabulary (ITALK, Peña et al., 2018).* The assumption of homogeneity of regression slope was violated for the analysis of Vietnamese vocabulary. Therefore, a multiple regression analysis was conducted with the main effects of intervention status and baseline Vietnamese vocabulary as well as explicit modelling of the interaction between intervention status and children’s baseline Vietnamese vocabulary. The model explained 81.02% of the total variance in children’s post-intervention Vietnamese vocabulary, $F(3, 22) = 36.58, p < .001$. Higher baseline Vietnamese vocabulary was linked to higher post-intervention Vietnamese vocabulary, $\beta = .89, p < .001$. There was no significant main effect of intervention status on children’s post-intervention Vietnamese vocabulary, $\beta = -.04, p = .62$. However, there was a significant interaction between intervention status and baseline Vietnamese vocabulary, $\beta = -.21,$
An examination of the scatter plot indicated that the Control group had a faster rate of increase in its post-intervention Vietnamese vocabulary compared to that in the Intervention group (Figure 3).

*English Vocabulary (ITALK, Peña et al., 2018).* Analysis using the Quade’s Rank ANCOVA was conducted to address the violation of the assumption of normality for children’s English vocabulary usage. The results indicated that after adjusting for their baseline score, there was no statistically significant difference between the Intervention and Control groups on post-intervention English vocabulary usage, $F(1, 24) = 1.85, p = 0.19, \eta^2_p=0.07$.

*Number of Words Spontaneously Named on VSA (Phạm et al., 2016).* After controlling for the baseline score, there was no statistically significant difference between the Intervention and Control groups in the number of spontaneous words they produced as assessed in VSA at post-intervention, $F(1, 25) = 1.34, p = 0.26, \eta^2_p=0.05$.

**Perception of Talking.**

*Children’s Feelings About the Way They Talk in Vietnamese (SPAA-C, McLeod, 2004).* The results indicated that after adjusting for the baseline score, the children in the Intervention and Control groups did not differ statistically significantly feeling happy speaking Vietnamese at post-intervention, $F(1, 21) = 3.05, p = 0.10, \eta^2_p=0.13$. Nevertheless, given the moderate to large effect size, the trend with the Intervention group scoring higher in feeling happy speaking Vietnamese has practical significance despite a lack of statistical significance (likely due to a small sample size).

*Children’s Feelings About the Way They Talk in English (SPAA-C, McLeod, 2004).* The results indicated that after adjusting for the baseline score, the children in the Intervention and
Control groups did not differ at a statistically significant level in feeling happy speaking English at post-intervention, $F(1, 21) = 1.99, p = 0.17, \eta_p^2 = 0.09$. Similarly, given the moderate to large effect size, the trend with the Intervention group scoring higher in their enjoyment of speaking English has practical significance despite a lack of statistical significance (likely due to the small sample size).

**Language Environment.**

*Weekly Vietnamese Language Exposure (Buac et al., 2014).* After controlling for the baseline weekly exposure, the children in the Intervention and Control groups did not differ statistically significantly in their percentage of weekly Vietnamese language exposure at post-intervention, $F(1, 23) = 1.13, p = 0.30, \eta_p^2 = 0.05$.

*Frequency of Parents Encouraging Children to Speak Vietnamese at Home.* Data for the frequency of parents encouraging children to speak Vietnamese at home were collected for the intervention group only. A paired-sample t-test was conducted to evaluate the impact of the intervention on parents’ effort in promoting children’s Vietnamese language use at home. The result indicated that parents encouraged their children to speak Vietnamese at home more frequently at post-intervention ($M = 4.46, SD = 0.78$) compared with that at pre-intervention assessment ($M = 4.08, SD = 1.04$), $p = 0.02$, Cohen’s $d = 0.74$.

*Presence of a Family Language Policy.* Data for the presence of family language policy were collected for the Intervention group only. A McNemar’s test was conducted and the result indicated that there was no significant change in the proportion of the participants having a family language policy at post-intervention (58.33%), when compared with the proportion pre-intervention assessment (41.67%), $p = .63$.  

27
Discussion

This study aimed to determine whether attending the VietSpeech SuperSpeech program impacted Vietnamese-Australian children’s speech and language production in Vietnamese, their perceptions of talking, and their families’ approaches to home language maintenance. There were three significant findings: (a) The Intervention group was reported to be significantly more intelligible (ICS) in English after the intervention. (b) There was a significant interaction between intervention status and children’s Vietnamese vocabulary (ITALK) with the growth rate being faster for the Control group. (c) Parents in the Intervention group significantly increased their encouragement for their children to speak Vietnamese at home. Additionally, there was a moderate to large effect size for the effect of intervention on children’s perception of feeling happy talking in both Vietnamese and English (SPAA-C) despite a lack of statistical significance. There was no significant mean change from pre- to post-intervention compared with the Control group for measures of consonant accuracy in Vietnamese (PCC-D) and English (PCC-S), intelligibility (ICS) in Vietnamese, Vietnamese language proficiency (i.e., speaking, understanding), English vocabulary (ITALK), number of spontaneous words named, percentage of exposure to Vietnamese during the week, or the presence of a family language policy (Table 2).

First, children’s improved intelligibility in English may be interpreted to indicate the positive effects of the VietSpeech SuperSpeech program on children’s speech production. The program’s focus on aspects of English including consonants, syllable shapes (e.g., consonant clusters), and polysyllabic words supported the children to produce and differentiate sounds in English compared with Vietnamese. Previously, researchers have found training on sound
production and sound perception/differentiation facilitated learners’ ability to produce sounds within their languages (Bradlow et al., 1997, 1999; Junttila & Ylinen, 2020; Lambacher et al., 2005; Trofimovich et al., 2009). While all participants spoke some degree of Vietnamese and English, many of the children were reported to be English-dominant at home (e.g., their parents would speak to them in Vietnamese, but the children would choose to respond in English). Improved intelligibility in English after the intervention may reflect the program’s impact on the children’s dominant language. In addition, the program’s focus on encouraging parents to interact with their children more during daily routines, book reading, and other activities may have led to an increase in frequency of parent-child interactions and as a result, improved parental understanding of what their children were saying in English.

Second, children’s Vietnamese vocabulary was found to grow faster for the Control group than the Intervention group. This surprising finding could be explained by the fact that most of the Control group children spent the 10 weeks between the pre- and post-intervention assessments at home with their families due to either the summer holidays or online schooling as a result of COVID-19 restrictions. Researchers have found the amount of time children spend with their parents who speak their home language is positively linked with their home language proficiency (Bayley et al., 1996; Dixon et al., 2012; Kondo, 1997). Most children in the Intervention group attended school during the day between the assessments, thus had greater exposure to English.

Third, parents in the Intervention group encouraged their children to speak Vietnamese at home more frequently at post-intervention compared with pre-intervention. This may indicate the
influence of the intervention on parents’ language management. This finding was also supported in the qualitative evaluation of the SuperSpeech program where parents reported:

In short, [my child] loves Vietnamese more and her Vietnamese speaking has improved… this is a wonderful start for my daughter’s long journey of learning Vietnamese!

[Ngàn gọn lại là em thấy bé đã yêu tiếng Việt hơn trước và khả năng nói tiếng Việt đã cải thiện hơn ah. Những ngày cơ như là bước khởi đầu tốt đẹp trong chặng đường dài học tiếng Việt của con ah.]

… I have learnt how to combine teaching Vietnamese with other activities for [my child] to be more engaged, for example, [my child] loves drawing so I wrote the words for things that he drew and taught him how to read the words…”

[ém đã biết cách kết hợp dạy tiếng Việt cho [my child] hômวิ dụ như [my child] rất thích vẽ nên em đã viết tiếng Việt của các thứ cháu vẽ ra và dạy cháu đọc,]

Parents in the Control group were not asked about whether they encouraged their children to speak Vietnamese at home more frequently at post-intervention compared with pre-intervention, so a statistical comparison cannot be made. However, the change in attitude and behavior for the Intervention group is an important finding of the current study, aligning with previous research that identified parents’ positive attitudes and practices as one of the most significant influences upon children’s home language maintenance (Tran et al., 2021b, 2021c, 2021d; Verdon et al., 2021a). The intervention proved successful in providing them with the tools to encourage an increase in children’s use of their home language and convincing parents of the value of home language maintenance. For example, one parent said “The first thing I learnt is children can speak many languages and this does not negatively affect their language ability” [Điều thứ nhất mình học là mình biết khi trẻ có thể nói được nhiều ngôn ngữ, không ảnh hưởng gì đến khả năng nói ngôn ngữ] (Verdon et al., 2021b, p. 31). Although significant changes in children’s Vietnamese vocabulary and intelligibility were not seen in the current data this may be due to the fact that post-assessment data were collected immediately at the end of the intervention and therefore the long-term impact of this positive shift in attitude had not yet been realized in the child participants.
There was a trend towards significance in the relationship between children’s attitudes regarding their talking in both English and Vietnamese and their participation in the VietSpeech SuperSpeech program, with moderate to large effect sizes. This may suggest the effectiveness of the program on enhancing children’s engagement and enjoyment in their home language learning and home language use. Changes in children’s attitudes towards using their home language were also captured in the qualitative analysis of the impact of the SuperSpeech program:

“Right after the 1st session, I noticed my son got more interested in Vietnamese, he asked me more questions like What is it in Vietnamese? What does it mean? etc...”

“After learning a new word, she said now I know how to say this word (with proud voice 😊).”
[Sau khi học được thêm một từ Tiếng Việt mới thì bé nói là con đã biết từ này tiếng Việt nói như thế nào rồi (nói giọng rất tự hào 😊)]

Similar findings are present in previous studies where children were found to develop positive attitudes towards a learned language (e.g., Navarro-villarroel, 2011). A shift in children’s attitudes is key to successful home language maintenance given that children ultimately have autonomy over which language they choose to speak (Verdon et al., 2021a).

The lack of significant improvement in the other measures of Vietnamese and English children’s speech and language, and their home language practices could be explained by either the duration, dose, or online format of the program. The program was planned to be face-to-face and was changed to online format due to COVID-19 restrictions, which reduced the duration of each session to 1-hour/week for 8 weeks. Frequently, home language programs run for a longer duration; for example, effective parent-training has been reported to run for a total of 23 hours (1-hour/week over 6 months) (Roberts & Kaiser, 2011) or 20 to 30 weeks in the school environment (Hulme et al., 2020). A review of effective dosage for speech intervention across
199 papers found that most studies provided intervention “two to three times per week in individual sessions delivered by an SLT [speech and language therapist] in a university clinic, in sessions lasting 30–60 min comprising 100 production trials” (Sugden et al., 2018, p. 718). The group intervention format allowed only for brief practice of speech sounds in both languages. Intervention aimed to raise parent awareness of the differences between speech sounds in each language, help them identify which sounds their children found difficult, and equip them with strategies for supporting accurate production of problematic speech sounds at home. Pre- and post-intervention measures of the percentage of consonants correct may not have been sensitive enough for demonstrating change in speech sound production if the children only had difficulties with a few speech sounds at baseline, or if they required a higher intensity practice than the group program could offer to achieve the desired improvement. In contrast excerpts from seven different parents’ interviews after the SuperSpeech program demonstrate the positive impact upon both parents and children in relation to speech and language proficiency: (a) “there are many changes. My kid speak Vietnamese more often, his Vietnamese vocabulary increased, his pronunciation is also better” [Có thay đốì nhiêu. Thầy con mình nói tiếng Việt nhiều hơn, từ vựng tăng thêm, phát âm cùng chuẩn hơn]; (b) “her vocabulary’s increased” [vốn từ vựng của bé tăng lên]; (c) “she has more vocabulary” [con biết thêm nhiều từ]; (d) “there is much progress. She learnt to pronounce difficult sounds in the program…and she corrected her pronunciation. She can now say correctly some sounds like ‘ng’” [nó tiến bộ hơn nhiều. Những âm khó là nó học được qua chương trình… và nó sửa được, nói rõ hơn, âm /ng/]; (e) “…made him interested in letters and in general he can now copy and pronounce Vietnamese sounds quite well” […thi nó chú ý đến chữ nhiều hơn và nói chung là nó có thể bất chút được phát âm tiếng Việt khá là
tốt.]; (f) “First my daughter can pronounce better. Second she learns letters in Vietnamese” [Thứ nhất là cách phát âm của con. Thứ hai, con biết mặt chữ tiếng Việt.]; (g) “better pronunciation” [phát âm tốt hơn]. Furthermore, two parents indicated that their English pronunciation had improved; for example, “There is a change in my English pronunciation. It became more correct.” [Có thay đổi về cách phát âm tiếng Anh. Nó chuẩn hơn].

Implications

This study has implications for parents, teachers, and health professionals who work with multilingual children. The most significant impact of the current study is the demonstrated ability of an intervention program to shift attitudes and behaviors towards home language maintenance. In the current study, parents significantly increased their encouragement of children to speak in Vietnamese as a result of participating in the intervention. Creating an environment in which the home language is visible and valued is an essential first step in supporting home language maintenance in children (Verdon et al., 2021a). This study modelled bilingualism throughout the program and provided parents with the opportunity to learn from one another. Additionally, this study reaffirmed that children benefit from speech and language maintenance interventions, including improved intelligibility and positive attitudes towards speaking a language. Children’s attitudes towards a language are not static and can be improved when children are exposed to that language and when they are surrounded by positive attitudes towards their home language (Verdon et al., 2021a). Consequently, it is recommended that SLPs talk with parents, teachers and children themselves about maintaining their home language and discuss the possibility of working on bilingual speech and language goals that support home language maintenance. Bilingual intervention should be preceded by an assessment in all of the languages spoken by the
child as well as by the child’s parents (see the tutorial for undertaking multilingual speech
assessments in McLeod et al. (2017) and an example of assessing two children within a 3-
generational Vietnamese family in McLeod, Margetson et al., 2021)

Furthermore, while it was possible to make some statistically significant changes during
8-hours of online speech and language maintenance intervention, greater statistical change may
require interventions of higher degree of intensity and longer duration to take effect. A follow-up
paper is currently being written that demonstrates additional clinical (non-statistical benefits) of
the online program via a qualitative study analysing data from interviews, emails, and other
artefacts from the VietSpeech SuperSpeech program (Verdon et al., 2021b). Some relevant
quotes have been included in the current paper, and these final quotes provide a summary of the
broad ranging reach of the parents’ positive opinions:

I have learnt how to help my children learn and use Vietnamese. More importantly, I have chance to spend
more time with my boys, which I didn't notice could be so meaningful. I feel warm when reading books
with them every evening, explaining to them the meaning of the words or answering their questions. The
program is not just about maintaining Vietnamese but also about strengthening the bond between parents
and children. (quote from a father)

Tham gia chương trình, tôi không chỉ biết các cách hỗ trợ con phát triển cả hai ngôn ngữ Việt-Anh mà còn
dánh nhiều thời gian đọc truyện với con hơm, điều mà trước đây tôi không nghĩ quan trọng đến như vậy. Tôi
thấy một sự ấm áp mới tới 2 bọ con ngồi đọc truyện với nhau, tôi thích việc giải thích cho con, hay giúp con
làm các hoạt động về ngôn ngữ.

Changes in parents and children after 8 weeks’ training program are substantial. I thank you and all the
instructors of the VietSpeech project very much. If there are similar initiatives in the future, I would love to
participate again!

[Những thay đổi tích cực từ phía bố mẹ và các con có được sau 8 tuần học là rất đáng kể. Em cảm ơn chị và
các cô giáo của chương trình VietSpeech rất nhiều! Nếu trong tương lai chương trình có thêm nhiều sáng
kiên khác thì em mong lại được tham gia ah!]

**Limitations of the Study**

Despite the effects of the VietSpeech SuperSpeech program, there were several
limitations related to the format and sample size. First, the online format of the assessment and
intervention sessions had some restrictions. Although there is emerging evidence of the general
efficacy of telepractice versus in-person intervention and assessment (Behl et al., 2017; Coufal et al., 2018; Quinn et al., 2021), there were a few issues that were noted in the current study. Online assessment may have affected the perception of accuracy of children’s speech production (e.g., several participants demonstrated a lisp which was difficult to accurately perceive and transcribe online) (Dahl et al., 2021) and limited the time of assessment and intervention due to children’s online attention span. While the online format allowed for the participation of families from many different locations, the content had to be reduced to accommodate the limited duration of each session. The online format did not allow for fidelity measurement of delivery and dosage (e.g., number of productions of words) for the Intervention group. Second, the sample size was limited due to COVID-19 restrictions and the Control group families’ hesitation to participate in the post-test because there was no perceived additional benefit. Finally, the immediate collection of follow up data did not enable monitoring of the potential long-term impact of the program upon children’s bilingual speech production and home language maintenance.

**Future Directions**

This study demonstrated that a multilingual intervention program positively impacted some aspects of children’s speech and language maintenance. Since this was a pilot feasibility study using a case-controlled design, further research involving a randomized trial increased intensity and a larger sample size is warranted to disambiguate the impact of intervention focussing on speech accuracy and home language intervention. This study was designed for face-to-face intervention and was modified to online format due to COVID-19 restrictions. A face-to-face version would allow for longer sessions enabling greater participation from the children and families. The future qualitative study of the families’ insights and feedback provides another
aspect of the outcomes of intervention and the families’ feelings and perceptions that are not always measurable quantitatively.

**Conclusion**

This study presents preliminary evidence that the 8-hour online group VietSpeech SuperSpeech program targeting speech skills and home language maintenance had some impact on Vietnamese-Australian children’s speech and home language maintenance. Specifically, parents in the Intervention group significantly increased encouragement of their children to speak Vietnamese. The Intervention group significantly increased intelligibility in English. Growth of Vietnamese vocabulary was faster for the Control group. There was a moderate effect of intervention for children’s perception of being happy talking in Vietnamese and English. There was no significant mean change from pre- to post-intervention compared with the Control group for measures of speech sound production in Vietnamese or English, Vietnamese intelligibility, English vocabulary, or hours of Vietnamese spoken each week.

Home language maintenance provides significant benefits for both individuals and societies. Multiple factors influence whether children will maintain their home language when immersed in an otherwise English-dominant context. Two major factors that influence whether a home language will be maintained are parental attitudes towards the value of home language maintenance and children’s choice to speak the home language. The current study demonstrated that an intervention program for bilingual children has the ability to influence both of these factors. Language learning is a protracted process that occurs over many years, as such a short-term intervention may not immediately see significant results in language scores but may lay the foundation to nurture language development in the family unit. The findings of this study
highlight the importance of supporting families in their goal of maintaining home languages by providing them with the knowledge and strategies to achieve this goal.

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Disclosure Statement

The authors created the VietSpeech SuperSpeech program described in this paper. Sharynne McLeod is co-author of the Intelligibility in Context Scale and the Vietnamese Speech Assessment.

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## Appendix A. VietSpeech SuperSpeech weekly intervention focus and attendance*

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Word superpower focus</th>
<th>Speech superpower focus</th>
<th>Home language maintenance (HLM) focus</th>
<th>Homework</th>
<th>No. of children</th>
<th>No. of family members &lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
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</table>
| 1    | Welcome All about me | Your favourite things | First sound in favourite things | Facts about multilingualism Phonological awareness: typical development | a) Book reading  
  b) Cook with family | 14 | (9 mothers; 4 fathers; 1 sibling) |
|      |                   |                       |                         |                                      |          |                |                               |
| 2    | My special sound (in your name) | Treasure hunt for things that start with your special sound | First sound and letter in your name Focus on /m/ ‘m’ video | Benefits of home language maintenance | a) Book reading  
  b) Learn Vietnamese song  
  c) Watch video of your special letter/sound | 14 | (11 mothers; 3 fathers; 4 siblings) |
|      |                   |                       |                         |                                      |          |                |                               |
| 3    | Same and different sounds across languages | Language identification tasks (e.g., are these children speaking Vietnamese or English?) | /s/ = ‘s’ in English and ‘x’ in Vietnamese /s/ ‘x’ video | Maintaining Vietnamese at home: tips 1-5 | a) Make Vietnamese visible in your home  
  b) Book reading: spot tone markers  
  c) Make a birthday card/write a letter in Vietnamese  
  d) Tone craft | 14 | (11 mothers; 3 fathers; 3 siblings) |
|      |                   |                       |                         |                                      |          |                |                               |
| 4    | Short and long sounds (plosives and fricatives) | Food words Demonstration of multilingual book reading using *Where is the Green Sheep* focusing on opposites, colours, asking questions | Short and long sounds Focus on /f/ ‘ph’ and /p/ ‘p’ videos | Maintaining Vietnamese at home: tips 6-10 | a) Book reading: find words that start with ‘ph’; *Where is the Green Sheep?*  
  b) Food challenge: cooking, shopping or ordering food in Vietnamese | 13 | (10 mothers; 3 fathers; 5 siblings) |
|      |                   |                       |                         |                                      |          |                |                               |
| 5    | Loud and quiet sounds (voiced and) | Colours and numbers using *The Hungry Caterpillar* | Loud and quiet sounds Focus on /x/ ‘kh’ | Managing emotions around home language maintenance | a) Book reading: identify long/short, loud/quiet sounds | 13 | (9 mothers; 5 fathers; 3 siblings) |

*Numbers of children and family members vary across weeks due to different family structures and participation levels.*
<table>
<thead>
<tr>
<th></th>
<th>voiceless sounds)</th>
<th></th>
<th></th>
<th>(emotional wellbeing)</th>
<th></th>
<th>b) ‘kh’: write/draw words</th>
<th>c) Picture card games</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Tricky sounds</td>
<td>Fruit Verbs</td>
<td>Tricky sounds Focus on /ŋ/ ‘ng’ or ‘ngh’</td>
<td>Multilingual speech and language development Oral-literate continuum</td>
<td>a) Book reading</td>
<td>b) Find/draw/write words starting with ‘kh’, ‘ng’, ‘ngh’</td>
<td>c) Learn a dance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>7</td>
<td>End sounds</td>
<td>Body parts Animals</td>
<td>End sounds (occur more frequently in English than Vietnamese)</td>
<td>Family language policy</td>
<td>a) Book reading: Elmer the Elephant – colours, discussing beginning/ middle/ end of story</td>
<td>b) Picture card games</td>
<td>c) Watch a Vietnamese movie</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>Friendly sounds (consonant clusters)</td>
<td>Verbs</td>
<td>Friendly sounds (consonant clusters) Multisyllabic words (both only occur in English)</td>
<td>Parent discussion and feedback on program (allow extra time)</td>
<td>a) Family language policy</td>
<td>b) Setting goals for your child</td>
<td>c) Identify children’s favourite activities from program to continue at home</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

*a This table details the recommended intervention plan. Minor changes to the order of the content have been made following participant and team member feedback, but the general structure and content of the actual study intervention is the same.

*b Some participants had two names (VN and English). We asked them to use both names, but they all chose to use one name.

*c Number of family members = number of people who could be seen on the zoom call. Anecdotal evidence that more family members were present.

*d Vietnamese Children’s Television VTV7 Youtube M [https://www.youtube.com/watch?v=5bc-9BauXFc](https://www.youtube.com/watch?v=5bc-9BauXFc)

*e Vietnamese Children’s Television VTV7 Youtube X [https://www.youtube.com/watch?v=9bRyqv1Piek](https://www.youtube.com/watch?v=9bRyqv1Piek)

*f Vietnamese Children’s Television VTV7 Youtube P [https://www.youtube.com/watch?v=fCZw8HoD1Zw](https://www.youtube.com/watch?v=fCZw8HoD1Zw); and PH [https://www.youtube.com/watch?v=KWElEhpaAZ0](https://www.youtube.com/watch?v=KWElEhpaAZ0)

*g Vietnamese Children’s Television VTV7 Youtube KH [https://www.youtube.com/watch?v=c2kAm44gAS8](https://www.youtube.com/watch?v=c2kAm44gAS8)

*h Vietnamese Children’s Television VTV7 Youtube NG [https://www.youtube.com/watch?v=84fl7ouDD7A](https://www.youtube.com/watch?v=84fl7ouDD7A); and NGH [https://www.youtube.com/watch?v=TsTKCTr9YVE](https://www.youtube.com/watch?v=TsTKCTr9YVE)
Table 1

Characteristics of the Intervention and Control Groups in VietSpeech SuperSpeech Program at Pre-intervention Assessment (n = 30)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Language</th>
<th>Control group (valid n)</th>
<th>Control group (^aM (SD)^b) (%)</th>
<th>Intervention group (valid n)</th>
<th>Intervention group (^aM (SD)^b) (%)</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age(^a)</td>
<td>In months</td>
<td>16</td>
<td>61.88 (25.52)</td>
<td>14</td>
<td>59.93 (10.51)</td>
<td>ns</td>
</tr>
<tr>
<td>Sex(^b)</td>
<td>Male</td>
<td>16</td>
<td>7 (43.75%)</td>
<td>14</td>
<td>7 (50.00%)</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9</td>
<td>9 (56.25%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socio-economic status(^a)</td>
<td>IRSAD</td>
<td>16</td>
<td>6.88 (2.85)</td>
<td>14</td>
<td>7.50 (3.11)</td>
<td>ns</td>
</tr>
<tr>
<td>Concerns about talking and speech sounds(^b)</td>
<td>PEDS</td>
<td>Yes</td>
<td>3 (18.75%)</td>
<td>14</td>
<td>2 (14.29%)</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>A Little</td>
<td>4 (25.00%)</td>
<td>0 (0.00%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9 (56.25%)</td>
<td>9 (64.29%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concerns about understanding what you say(^b)</td>
<td>PEDS</td>
<td>Yes</td>
<td>2 (12.50%)</td>
<td>14</td>
<td>2 (14.29%)</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>A Little</td>
<td>2 (12.50%)</td>
<td>0 (0.00%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12 (75.00%)</td>
<td>12 (85.71%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCC-S(^a)</td>
<td>VSA</td>
<td>Vietnamese</td>
<td>66.91% (9.47%)</td>
<td>14</td>
<td>71.95% (7.45%)</td>
<td>ns</td>
</tr>
<tr>
<td>PCC-D(^a)</td>
<td>VSA</td>
<td>Vietnamese</td>
<td>85.19% (9.52%)</td>
<td>14</td>
<td>86.23% (11.87%)</td>
<td>ns</td>
</tr>
<tr>
<td>PCC-S(^a)</td>
<td>DEAP</td>
<td>English</td>
<td>79.74% (22.07%)</td>
<td>14</td>
<td>85.37% (7.60%)</td>
<td>ns</td>
</tr>
<tr>
<td>Intelligibility(^a)</td>
<td>ICS</td>
<td>Vietnamese</td>
<td>3.67 (1.31)</td>
<td>12</td>
<td>3.77 (1.08)</td>
<td>ns</td>
</tr>
<tr>
<td>Intelligibility(^a)</td>
<td>ICS</td>
<td>English</td>
<td>4.39 (0.72)</td>
<td>14</td>
<td>4.27 (0.79)</td>
<td>ns</td>
</tr>
<tr>
<td>Language proficiency (speaking)(^a)</td>
<td>Vietnamese</td>
<td>2.94 (1.39)</td>
<td>14</td>
<td></td>
<td>2.71 (1.27)</td>
<td>ns</td>
</tr>
<tr>
<td>Language proficiency (understanding)(^a)</td>
<td>Vietnamese</td>
<td>3.25 (1.18)</td>
<td>14</td>
<td></td>
<td>3.14 (1.17)</td>
<td>ns</td>
</tr>
<tr>
<td>Vocabulary(^a)</td>
<td>ITALK</td>
<td>Vietnamese</td>
<td>2.80 (1.32)</td>
<td>12</td>
<td>2.75 (1.36)</td>
<td>ns</td>
</tr>
<tr>
<td>Vocabulary&lt;sup&gt;a&lt;/sup&gt;</td>
<td>ITALK</td>
<td>English</td>
<td>14</td>
<td>4.00 (1.36)</td>
<td>13</td>
<td>3.85 (0.90)</td>
</tr>
<tr>
<td>----------------------</td>
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<td>----</td>
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<td>----</td>
<td>-------------</td>
</tr>
<tr>
<td>Number of words spontaneously named&lt;sup&gt;b&lt;/sup&gt;</td>
<td>VSA</td>
<td>Vietnamese</td>
<td>16</td>
<td>17.81 (21.26)</td>
<td>14</td>
<td>21.86 (17.15)</td>
</tr>
<tr>
<td>Children’s feelings about the way they talk&lt;sup&gt;c&lt;/sup&gt;</td>
<td>SPAA-C</td>
<td>Vietnamese</td>
<td>15</td>
<td>2.27 (1.03)</td>
<td>14</td>
<td>1.29 (0.91)</td>
</tr>
<tr>
<td>Children’s feelings about the way they talk&lt;sup&gt;c&lt;/sup&gt;</td>
<td>SPAA-C</td>
<td>English</td>
<td>15</td>
<td>2.80 (0.41)</td>
<td>14</td>
<td>2.36 (0.93)</td>
</tr>
<tr>
<td>Percentage of weekly language exposure&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Vietnamese</td>
<td>14</td>
<td>51.52% (23.70%)</td>
<td>14</td>
<td>43.93% (27.72%)</td>
<td>ns</td>
</tr>
</tbody>
</table>

Note. <sup>a</sup>M (SD), <sup>b</sup>n (%); IRSAD, Index of Relative Socio-Economic Advantage and Disadvantage; ns = not significant; PEDS, Parents’ Evaluation of Developmental Status (Glascoe, 2000); PCC-D, percentage of dialect consonants correct; VSA, Vietnamese Speech Assessment (Phạm et al., 2016); PCC-S, percentage of standard consonants correct; DEAP, Diagnostic Evaluation of Articulation and Phonology (Dodd et al., 2002); ICS, Intelligibility in Context Scale (McLeod, et al., 2012); ITALK, Inventory to Assess Language Knowledge (Peña et al., 2018); SPAA-C, Speech Participation and Activity Assessment of Children (McLeod, 2004); Percentage of weekly language exposure (Buac et al., 2014).
Figure 1

Participant and Randomization Flow Recruitment Diagram

- **Enrollment**
  - Eligible (n = 64)

- **Allocation**
  - Allocated to control (n = 39)
    - Did not meet inclusion criteria (n = 6)
    - Unavailable (n = 13)
    - Declined to participate (n = 4)
  - Allocated to Intervention (n = 25)
    - Responded to advertisement and met inclusion criteria (n = 25)
      - Unavailable (n = 5)
      - Did not complete paperwork (n = 10)

- **Assessment**
  - Pre-intervention assessment (n = 16)
    - Face-to-face (n = 16)
    - Hybrid (n = 0)
    - Online (due to COVID restrictions) (n = 0)
  - Pre-intervention assessment (n = 14)
    - Face-to-face (n = 0)
    - Hybrid (n = 4)
    - Online (due to COVID restrictions) (n = 10)

- **Intervention**
  - Control (n = 16)
    - Received no intervention (n = 16)
  - Intervention (n = 14)
    - Received 7-8 weeks of allocated intervention (n = 13)
    - Discontinued after week 6 (illness) (n = 1)

- **Follow-Up**
  - Post-intervention assessment (n = 16)
    - Face-to-face (n = 9)
    - Hybrid (n = 0)
    - Online (due to COVID restrictions) (n = 7)
  - Post-intervention assessment (n = 13)
    - Face-to-face (n = 0)
    - Hybrid (n = 3)
    - Online (due to COVID restrictions) (n = 10)

- **Analysis**
  - Analysed (n = 16)
  - Analysed (n = 13)
Figure 2(a)

VietSpeech SuperSpeech Team During an Online Intervention Session. Reprinted with permission from Sharynne McLeod and Sarah Verdon.
Figure 2(b)

VietSpeech SuperSpeech Team, Children and Families During an Online Intervention Session. Reprinted with permission from Sharynne McLeod and Sarah Verdon.
Figure 3

Graphic Illustration of the Change in Children’s Vietnamese Vocabulary for the Control and Intervention Groups Pre- and Post-Intervention