Internationally, cultural renewal and language revitalisation are occurring among Indigenous people whose lands were colonised by foreign nations. In Australia, the Aboriginal and Torres Strait Islander people are striving for the re-voicing of their mother tongue and the re-practicing of their mother culture to achieve cultural renewal in the wake of over 250 years of colonisation (Williams in Recover, re-voice, re-practise. Sydney, NSW AECG Incorporated, 2013). While 120 Indigenous languages are still spoken in Australia today, little has been documented regarding the extent to which languages are learned and maintained by young Aboriginal and Torres Strait Islander children. The current paper offers a unique insight by drawing upon a large-scale dataset, Footprints in Time: the Longitudinal Study of Indigenous Children (LSIC), to describe patterns of language use and maintenance among young Aboriginal and Torres Strait Islander children. Of the 580 children followed longitudinally from the first wave of the baby cohort of LSIC (aged 0'1 years) until wave 4 (aged 3'5 years), approximately one in five (19.3 %) were reported to speak an Indigenous language. Children in the study were learning up to six languages simultaneously, including English (both Standard Australian English and Aboriginal Australian English), Indigenous languages, creoles, foreign languages (other than English) and sign languages. Social and environmental factors such as primary caregivers' use of an Indigenous language and level of relative isolation were found to be associated with higher rates of Indigenous language maintenance. These findings have important implications for identifying ways of supporting Aboriginal and Torres Strait Islander children to learn and maintain Indigenous languages during early childhood, especially for children who may not have the opportunity to learn an Indigenous language in the home environment and for children living in urban areas.

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Indigenous language learning and maintenance among young Australian Aboriginal and Torres Strait Islander children

Sarah Verdon and Sharynne McLeod

*Charles Sturt University, Bathurst, Australia*

Correspondence:

Sarah Verdon, Research Institute for Professional Practice, Learning and Education (RIPPLE), Charles Sturt University, Panorama Ave Bathurst, New South Wales, Australia. Email: sverdon@csu.edu.au

Running head: Indigenous Australian children’s languages
Abstract

Internationally, a pan-renaissance period of cultural renewal and language revitalisation is occurring among Indigenous people whose lands were colonised by foreign nations. In Australia, the Aboriginal and Torres Strait Islander people are striving for the re-voicing of their mother tongue and the re-practicing of their mother culture to achieve cultural renewal in the wake of over 250 years of colonisation (Williams, 2013). While 120 Indigenous Australian languages are still spoken in Australia today, little has been documented regarding the extent to which languages are learned and maintained by young Aboriginal and Torres Strait Islander children. The current paper offers a unique insight by drawing upon a large-scale dataset, Footprints in Time: the Longitudinal Study of Indigenous Children (LSIC), to describe patterns of language use and maintenance among young Aboriginal and Torres Strait Islander children. Of the 580 children followed longitudinally from the first wave of the baby cohort of LSIC (aged 0 to 1 years) until wave 4 (aged 3 to 5 years), approximately one in five (19.3%) were reported to speak an Indigenous language. Children in the study were learning up to six languages simultaneously, including English (both Standard Australian English and Aboriginal Australian English), Indigenous languages, creoles, foreign languages (other than English), and sign languages. Social and environmental factors such as primary caregivers’ use of an Indigenous language and level of relative isolation were found to be associated with higher rates of Indigenous language maintenance. These findings have important implications for identifying ways of supporting Aboriginal and Torres Strait Islander children to learn and maintain Indigenous languages in early childhood, especially for children who may not have the opportunity to learn an Indigenous language in the home environment and for children living in urban areas.

Key words: Indigenous languages, children, multilingual, language maintenance, longitudinal, culture
Indigenous language learning and maintenance among young Australian Aboriginal and Torres Strait Islander children

Around the world the Indigenous populations of many colonised countries are experiencing a period of cultural renewal and language revitalization. The continuation and revitalisation of mother-tongue language is of great importance to Indigenous people as it is vehicle through which people come to know, understand, and interpret the world and identify themselves as part of a culture and a society (Marmion, Obata and Troy 2014; McCarty, 2003). The Indigenous inhabitants of Australia, the Aboriginal and Torres Strait Islander people, are the longest continuous civilization in human history. It is estimated that they have inhabited the continent of Australia for 50,000 years, or over 2,000 generations (Broome 1994). Indigenous Australian cultures were rich and diverse beyond contemporary measure prior to European settlement in 1788, consisting of over 600 tribal groups speaking an estimated 250 languages and 600 dialects (Australian Institute of Aboriginal and Torres Strait Islander Studies, AIATSIS 2005; Department of Environment, Climate Change and Water 2009; Walsh 1993). In the present day the history, traditions, cultural beliefs, practice and identity of the Aboriginal and Torres Strait Islander people continues to be transmitted through intergenerational and community exchange of language, oral storytelling, and cultural activities. Currently around 120 Indigenous Australian languages are still spoken (Marmion, et al. 2014). Of these languages, around 13 are considered “strong” (Marmion et al. 2014, xii), being passed down to new generations in their full form while around 100 Indigenous languages are considered to be severely or critically endangered according to the language endangerment scale (Marmion et al., 2014; University of Hawai‘i 2014). As a result Australia has been identified as the continent where the most rapid decline in languages is occurring (Nettle and Romaine 2000).

From the earliest times, the Aboriginal and Torres Strait Islander people were multilingual, that is, they spoke and understood more than one language. In fact, Aboriginal and Torres Strait Islander people have been labelled “the leading contenders for being the most multilingual people in the world" (Laycock 1979, 82). Multilingualism arose from the need to communicate with neighbouring tribes using languages that were mutually intelligible (Rumsey 1993). Personal accounts and research by anthropological linguists have reported that almost all Aboriginal and Torres Strait Islander people spoke at least two languages, with many speaking four or five languages and in some tribes people could speak up to 10 languages (Creative Spirits 2013; Rumsey 1993). It was not until European settlement in 1788 and the subsequent establishment of the Commonwealth government in 1901 that monolingualism, namely the use of English as the lingua franca, was adopted in Australia. The introduction of language policies directed towards the assimilation of Aboriginal and Torres
Strait Islander people into a ‘white Australia’ (where monolingualism and monoculturalism were foregrounded) saw the loss of many Indigenous languages. Despite these policies, many Aboriginal and Torres Strait Islander people continued to use their own language, facilitating the continuation of their people’s culture, history and traditions.

As a result of contact with European settlers and government policies which ordered the removal of Australia’s original inhabitants from tribal lands on to missions and reserves (Australian Law Reform Commission 1986), the Aboriginal and Torres Strait Islander people also began to speak English. The type of English commonly spoken by the Aboriginal and Torres Strait Islander people was linguistically influenced by Indigenous languages and over time developed into a form of English with unique phonological, morphological and syntactic features that is now recognised as its own dialect known as Aboriginal Australian English (Arthur 1996; Butcher 2008). Contact with Europeans settlers and the co-habitation of Aboriginal and Torres Strait Islander people who were speakers of mutually unintelligible languages from different tribes in the same missions and reserves also led to the creation of pidgins (a form of speech containing elements from both speakers’ languages, Walsh 1993) which over time developed in creoles (an English-based language containing elements of both speakers’ languages, Walsh 1993) to enable communication between Aboriginal and Torres Strait Islander people from different language groups and with European settlers and authorities.

The Aboriginal and Torres Strait Islander people continue to strive for the re-voicing of their languages and the re-practising of their cultures in the present day (Williams 2013). Language revitalisation programs are being developed and implemented in Aboriginal and Torres Strait Islander communities across Australia to support the continuation of Indigenous language use among communities and families (Marmion et al. 2014). At least 30 of the Indigenous Australian languages listed as severely or critically endangered are currently seeing an increase in use as a result of such programs (Marmion et al. 2014).

Multilingual Language Acquisition

The development and maintenance of home languages promotes a strong sense of self and cultural identity (Puig 2010) which in turn has many individual, cognitive and social benefits (Adesope, Lavin, Thompson, and Ungerleider 2010). The acquisition of multiple languages occurs in two main ways: simultaneously or sequentially. Simultaneous language acquisition occurs when a child is exposed to multiple languages from early childhood (Paradis, Genesee, and Crago 2011). Sequential language learning occurs when additional languages are learned after the establishment of a first language (Tabors 1997). Both types of multilingualism are present among Aboriginal and Torres Strait Islander children. The type of multilingualism
varies depending on children’s environment. For example, an Aboriginal or Torres Strait Islander child living in an urban area may be a simultaneous multilingual child, learning an Indigenous language in the home environment with additional exposure to English in the home and in the broader social context. On the other hand, a sequential multilingualism may occur in an Aboriginal or Torres Strait Islander child living in a remote community and who exclusively speaks an Indigenous language at home and in their community with limited exposure to English or other languages until they enter formal schooling. Another important phenomenon that occurs among multilingual children is subtractive multilingualism. This phenomenon occurs when the home language is lost as a result of a language shift towards the dominant language of an educational environment or social context (Roberts 1995). Subtractive multilingualism may occur among Aboriginal and Torres Strait Islander Australian children if children cease speaking Indigenous languages as their exposure to and use of English increases.

Language maintenance in young children

Intergenerational language exchange is a field of interest in countries the world over, with many seeking to identify factors that can facilitate or inhibit this process (Marshall 1994). Internationally, a number of social and environmental factors that have been found to be related to home language maintenance among multilingual children living in contexts where the home language is not the dominant language of the community. One of the strongest predictors of language maintenance is rich exposure to, and support of, languages in the home environment (De Houwer 2007; Lyon 1996; Verdon, McLeod, and Winsler 2014).

Researchers have also described barriers to home language maintenance among multilingual children with speech, language, and hearing difficulties. The commonly held myth that multilingualism is the cause of language difficulties in children has been found to influence parental decisions about maintaining the home language in English dominant contexts, especially when their children are presenting with speech or language concerns (King and Fogle 2006). Additionally, parents of children with hearing loss have reported ceasing to use their home language with their children (Crowe, Fordham, McLeod, and Ching in press). A systematic review did not demonstrate an association between multilingualism and children’s speech difficulties (Hambly, Wren, McLeod, and Roulstone 2013).

International researchers specifically considering Indigenous populations living in English-dominant countries (such as First Nations communities in Canada) have found that maintenance of an Indigenous language was more common among people living in remote communities with limited mobility between places of residence, while communities closest to urban areas showed the lowest levels of language maintenance.
In addition, higher rates of Indigenous language maintenance were observed among males as opposed to females and those with lower levels of school-based education (Burnaby and Beaujot 1986). A study in South America found that Indigenous language maintenance is supported by exposure to and support of the home language in education environments (Hornberger and King 1996). It was suggested that the presence of Indigenous languages in education environments, a context where language shift frequently occurs, facilitates use of multiple languages by reducing the perception of schools as monolingual environments where only the dominant language is allowed (Hornberger and King 1996). Previous research in the Australian context considered the varying ‘language landscapes’ of Aboriginal and Torres Strait Islander children and how this impacts upon their exposure to and use of Indigenous languages (Simpson and Wigglesworth 2008). Such language landscapes are shaped by the different situations in which Aboriginal and Torres Strait Islander children are reared (e.g. on tribal lands or in an urban setting) and the amount and type of input of languages from various interlocutors in their everyday lives at home, school and in the community.

McLeod, Verdon and Bennett’s Kneebone (2014) documented the language use of 692 young Aboriginal and Torres Strait Islander Australian children, demonstrating that while English (Standard Australian English or Aboriginal Australian English) was the most commonly spoken language, many children spoke Indigenous languages and creoles, and family members and friends told oral stories, and supported the children’s literacy development. The current study aims to contribute to what is known in this field by describing patterns of language maintenance that are occurring among the young Aboriginal and Torres Strait Islander Australian children included in the study and by identifying personal and environmental factors associated with language use and maintenance. In doing so it is hoped that these data will contribute to the current literature informing initiatives to facilitate the revitalisation and maintenance of Indigenous Australian languages.

**Context of the current study**

Footprints in Time: The Longitudinal Study of Indigenous Children (LSIC) is supported by the Aboriginal and Torres Strait Islander people and has been initiated, funded, and managed by the Australian Government to provide quantitative and qualitative data which offer insight into Aboriginal and Torres Strait Islander children’s early years and their development over time (Department of Families Housing Community Services and Indigenous Affairs, FaHCSIA 2012). Ultimately, LSIC aims to “improve the understanding of, and policy response to the diverse circumstances faced by Aboriginal and Torres Strait Islander children, their families and communities” (FaHCSIA 2013, 2) by engaging with Aboriginal and Torres Strait Islander families...
to find out “what Aboriginal and Torres Strait Islander children need to have the best start in life and grow up strong” (FaHCSIA, 2013, 2).

The previously established and nationally representative Longitudinal Study of Australian Children (LSAC) (Australian Institute of Family Studies, 2007) was unable to provide sufficient information about Aboriginal and Torres Strait Islander children. Consequently, this warranted the need for the commissioning of LSIC, which commenced in 2008 and is ongoing with annual waves of data collection. To date over 1,750 children and their families have been involved over six waves of data collection.

**Aims**

This paper aims to describe the cultural and linguistic diversity of Aboriginal and Torres Strait Islander children by answering the following research questions:

1. What is the linguistic diversity of Aboriginal and Torres Strait Islander children in the baby (B) cohort of LSIC?
2. What patterns of language maintenance are occurring within Aboriginal and Torres Strait Islander children in LSIC across early childhood?
3. What personal and environmental factors (including sex, use of an Indigenous language by a primary caregiver, level of relative isolation, primary caregiver’s concerns about speech, and ear and hearing problems) influence the maintenance of languages among Aboriginal and Torres Strait Islander children in LSIC?

**Method**

**Participants**

*Recruitment to LSIC*

The total number of children recruited to participate in wave 1 of the Longitudinal Study of Indigenous Children was 1,671. Children were separated into two different cohorts, the baby (B) cohort and the kindergarten (K) cohort. Children in the B cohort were mostly aged between 6 and 18 months and children in the K cohort were mostly between 3 years 6 months and 4 years 6 months (FaHCSIA 2012). The sample was not designed to be representative of the Aboriginal and Torres Strait Islander Australian population. Rather, 11 data collection sites were chosen to cover a range of socioeconomic and community environments where Aboriginal and Torres Strait Islander children live. These sites were chosen to ensure approximately equal representation of urban, regional and remote areas and to approximately represent the concentration of
Aboriginal and Torres Strait Islander people around Australia. Families of approximately 150 children from each site were approached to participate in the study.

Approval to participate in the study was gained from community elders before recruitment and subsequent data collection began (FaHCSIA 2013). A non-representative purposive sampling design was implemented from which eligible families were approached and consent was voluntarily obtained from participants. Full information about the interviews and questionnaire content is available from FaHCSIA (2012). Waves of data in the current sample were collected annually to ensure regular contact with families to maximise retention rates. To date, data have been released for waves 1 to 4. As wave 2 did not collect information regarding languages for children who had participated in wave 1, the current study focuses on data collected at waves 1, 3 and 4.

**Participants in the current sample**

Participants selected for inclusion in the current study were 580 children (and their primary caregivers) in the B cohort of LSIC who were aged between 0 and 2 years at the time of wave 1 of data collection, who were present in waves 1, 3 and 4 of data collection and had the same primary caregiver who provided information at all three waves. Children who were missing from waves 1, 3 or 4 or who left the LSIC study were excluded so that data could be examined longitudinally. At wave 1, children in the sample were aged between 3 and 24 months. Children in the sample had a mean age of 14.9 months. At wave 3 children were aged between 24 and 51 months with a mean age of 36.9 months and at wave 4 children were aged between 33 and 63 months with a mean age of 48.6 months at the time of the interview. There were 301 (51.9%) males and 279 (48.1%) females in the sample. Children’s Indigenous status was listed as Aboriginal (n = 519, 89.5%), Torres Strait Islander (n = 32, 5.5%) or both (n = 29, 5.0%). At each wave children’s level of remoteness was calculated using a classification system of geographical isolation known as Level of Relative Isolation (LORI, Zubrick et al. 2004). At wave 1 children’s level of relative isolation was identified as high/extreme (n = 38, 6.6%), moderate (n = 72, 12.4%), low (n = 287, 49.5%) or none (n = 183, 31.6%). The total number of people living in the children’s households ranged from 2 to 15 with an average of 4.9 people per household.

Information about the child was collected from their primary caregiver, who was identified as the person who knew the study child best. In some cases the child’s primary caregiver changed between waves. In order to ensure consistency in the interpretation of longitudinal findings only children whose primary caregiver was the same person at all three time points considered in the current paper were included in this study. In 97.4% of cases the study child was the son or daughter of their primary caregiver. In the remaining 2.6% of cases the study child’s relationship their primary caregiver was listed as grandson or granddaughter, adopted, niece, or
extended family. In 99.0% (n = 574) of cases the primary caregiver was female. The age of primary caregivers ranged from 16 to 58 years. The Indigenous status of primary caregivers was reported as Aboriginal (n = 420, 72.4%), Torres Strait Islander (n = 27, 4.7%), both (n = 21, 3.6%), and neither (n = 112, 19.3%).

Procedure

In each wave of LSIC data collection was undertaken using face-to-face computer assisted personal interviews (CAPI). Interviews were conducted by Aboriginal and Torres Strait Islander fieldwork officers with the primary caregiver. Data were collected on a broad range of topics concerning the child, the primary caregiver, their family, community and educational environments. Questions answered by primary caregivers that pertained to the research questions of this study were extracted from the dataset and used to establish the findings presented in this paper.

Data analysis

Data analyses were undertaken using the Statistical Package for Social Sciences (SPSS) Version 20 (IBM, 2011). Analysis of the entire sample of 580 children described the languages spoken by the children and their primary caregivers at each wave. Chi square analyses were conducted to identify relationships between primary caregivers’ and children’s language use and children’s language maintenance over time. Additionally, analyses were undertaken on a subsample of children who were reported to speak an Indigenous language at wave 1 (n = 93) to examine variables that were potentially related to language maintenance. Chi square analyses were used to determine whether relationships existed between Indigenous language maintenance and personal and environmental factors including: sex, primary caregiver’s use of Indigenous language, and primary caregiver’s concerns about speech, and hearing problems. ANOVAs were used to determine if a relationship existed between children’s level of relative isolation and their maintenance of an Indigenous language. The data collected regarding languages named individual Aboriginal and Torres Strait Islander languages. However, in the reporting of language data all Aboriginal and Torres Strait Islander languages are grouped together and referred to as ‘Indigenous languages’ to protect the confidentiality of the participants from smaller language groups. It is acknowledged that the grouping of languages does not allow for consideration of patterns of acquisition and maintenance occurring within individual languages.

Results

The linguistic diversity of Aboriginal and Torres Strait Islander children aged between 0 and 5 years

At wave 1, when 0 to 2 years of age, children in the sample were learning to speak between one and five languages (see Table 1). Approximately one in six children (n = 93, 16.0%) were learning to speak an
Indigenous language, 96.2% (n = 558) spoke English (Standard Australian English or Aboriginal Australian English), and 2.8% (n = 16) spoke a foreign or sign language. At wave 3, when the children were 2 to 4 years of age, children in the sample spoke between one and four languages (see Table 1). Nearly one in five children (n = 112, 19.3%) spoke an Indigenous language, 99.0% (n = 574) spoke English (Standard Australian English or Aboriginal Australian English), and 4.0% (n = 23) spoke a foreign or sign language. By wave 4, when the children were 3 to 5 years of age, a number of children in the sample continued speaking multiple languages. In total children could speak between one and six languages (see Table 1). Again around one fifth of children (n = 112, 19.3%) spoke an Indigenous language, 100.0% (n = 580) spoke English (Standard Australian English or Aboriginal Australian English), and 2.8% (n = 16) spoke a foreign or sign language.

**Dominant language**

Many children in the study spoke more than one language. Information provided by the primary caregiver about how well their child spoke each language was used to create derived variables to identify the dominant language of the children. At wave 4, the majority (87.9%, n = 510) of the children in the study were dominant in English (Standard Australian English or Aboriginal Australian English), 5.5% (n = 32) were dominant in an Indigenous language and 4.7% (n = 27) of children were equally dominant in English and an Indigenous language.

**Language exposure in the home environment**

**Main language spoken at home**

All primary caregivers except one (99.8%) reported that English (Standard Australian English or Aboriginal Australian English) was one of the main languages spoken in the home. For 76.9% (n = 446) of the children in the study the main language spoken in the home was reported to be English (Standard Australian English or Aboriginal Australian English). In addition, 7.6% (n = 44) of children spoke an Indigenous language as a main language in the home, 2.6% (n = 15) spoke a creole and an Indigenous language as the main languages in the home, 0.9% (n = 5) spoke three Indigenous languages in the home, 0.5% (n = 3) families spoke two Indigenous languages and a creole in the home, 0.3% (n = 2) families spoke two Indigenous languages in the home, and 0.3% (n = 2) spoke Indigenous languages and a foreign language in the home. The family who did not speak any English in the home reported speaking two Indigenous languages and a creole in the home.

**Type of English spoken at home**

At wave 3 the primary caregiver was asked about the main type of English spoken in the home. Approximately half of the families (n = 327, 56.4%) used Standard Australian English in the home, that is, they
reported that their English did not contain any words from an Indigenous language and would sound the same as a person who was not Aboriginal or Torres Strait Islander person. Families speaking Aboriginal Australian English at home were described as using Light Aboriginal English that was “sometimes mixed with a few Aboriginal or Torres Strait Islander words” \( (n = 161, 27.8\%) \) or Heavy Aboriginal English “mixed with lots of Aboriginal or Torres Strait Islander words” that might be difficult for a person who was not Aboriginal or Torres Strait Islander to understand \( (n = 89, 15.3\%) \).

### Languages spoken by primary caregivers

At wave 1, the number of languages spoken by the primary caregiver ranged between one and eight (see Table 1). One fifth of primary caregivers spoke an Indigenous language \( (n = 119, 20.5\%) \), 96.9\% \( (n = 562) \) spoke English, and 3.3\% \( (n = 19) \) spoke a foreign language. The dominant language of primary caregivers was identified as English \( (86.2\%, n = 500) \), an Indigenous language \( (5.0\%, n = 29) \), and 8.8\% \( (n = 51) \) were equally fluent in both English and an Indigenous language. A Chi square analysis revealed there was a significant association between primary caregivers speaking an Indigenous language and their children speaking an Indigenous language at wave 4 (aged 3 to 5 years), \( \chi^2(1) = 220.6, p < .01 \). When primary caregivers spoke an Indigenous language, 67.2\% of children also spoke an Indigenous language; compared with 6.9\% who spoke an Indigenous language when their primary caregivers did not.

### Aboriginal and Torres Strait Islander culture

At wave 1 50.9\% \( (n = 295) \) of children were reported by their primary caregiver to be identified with a tribe, language group or clan and 52.2\% \( (n = 303) \) of children in the study were identified as having a connection to country (tribal lands). In wave 3, the primary caregiver was asked to identify from a list of 12 options the five most important aspects of Aboriginal and Torres Strait Islander culture that they would like to pass onto their children. Responses included aspects of culture such as knowing country, family history, language, traditions and ceremony and so on. Passing on Indigenous language was identified as one of the five most important aspects of culture by 24.3\% of primary caregivers.

### Longitudinal analyses of children’s languages

Patterns of language maintenance across early childhood among children who spoke an Indigenous language were examined. Of those who were identified as learning to speak an Indigenous language at wave 1 \( (n = 93) \), 76.3\% \( (n = 71) \) maintained speaking an Indigenous language until wave three and the same number were also speaking an Indigenous language at wave 4 (see Figure 1). It is important to note that the specific
Indigenous language spoken by the child was not identified and therefore it is possible that the Indigenous language spoken may have changed across the waves.

**Personal and environmental factors associated with language maintenance in Aboriginal and Torres Strait Islander children**

The impact of personal and environmental factors upon language maintenance among Aboriginal and Torres Strait Islander children was analysed. Factors considered were sex, whether the primary caregiver spoke an Indigenous language, and level of relative isolation, concerns about speech and language and ear and hearing problems.

**Sex**

Of the children who were learning to speak an Indigenous language at wave 1, 62.4% (n = 58) were male and 37.6% (n = 35) were female. Of these, 77.6% of males maintained speaking an Indigenous language until wave 4, while 74.3% of females maintained speaking an Indigenous language until wave 4. The relationship between sex and language maintenance was not found to be significant for this group ($\chi^2 (1)= .13$, $p=.72$).

**Use of an Indigenous language primary caregivers**

As expected, there was a significant relationship between primary caregivers speaking an Indigenous language and the maintenance of an Indigenous language by children from wave 1 to wave 4 ($\chi^2 (1)= 16.15$, $p<.01$), with 84.4% of children whose primary caregiver spoke an Indigenous language maintaining the language as compared with 37.5% of children maintaining an Indigenous language when their primary caregiver did not speak an Indigenous language.

**Level of relative isolation**

To examine the relationship between Level of Relative Isolation (LORI) at wave 1 and maintenance of an Indigenous language during early childhood, the ordinal LORI variable (1 = none, 2 = low, 3 = moderate, 4 = high/extreme) was treated as continuous, and one-way ANOVAs were run against whether or not children maintained speaking an Indigenous language. A statistically significant relationship was found between level of relative isolation at wave 1 and maintenance of an Indigenous language from wave 1 to wave 4. Children who maintained speaking an Indigenous language were more isolated ($M = 3.0$, $SD = 0.9$) than those who did not maintain speaking an Indigenous language ($M = 2.2$, $SD = 0.9$), with a significance level of $F(1,91) = 14.18$, $p<0.01$.

**Primary caregiver’s concerns about speech**


Analyses were undertaken to determine whether primary caregiver concern about children’s speech was an influential factor in the maintenance of an Indigenous language. Among children who were learning to speak an Indigenous language at wave 1, concerns about speech were expressed for 15.1% \((n = 14)\) of children by wave 4. A Chi square analysis showed no significant relationship between concerns about speech and Indigenous language maintenance \((\chi^2 (1)= 1.33, p=.25)\) with 64.3% of children whose primary caregivers identified speech concerns maintaining an Indigenous language as opposed to 78.5% of children for whom no speech concerns were reported.

**Ear and hearing problems**

The relationship between hearing and ear problems and maintenance of an Indigenous language was also investigated. At wave 4 primary caregivers reported ear problems including otitis media, perforated ear drums, hearing loss and other ear problems for 11.8% \((n = 11)\) of children who were learning to speak an Indigenous language from wave 1. A Chi square analysis showed no significant relationship between ear and hearing problems and Indigenous language maintenance from wave 1 to wave 4 \((\chi^2 (1)= .21, p=.65)\) with 81.8% of children with ear or hearing problems maintaining speaking an Indigenous language as opposed to 75.6% of children for whom no problems were reported (see Table 2).

**Discussion**

The findings of this study make an important contribution to the limited information that is currently known about Aboriginal and Torres Strait Islander children’s use and maintenance of Indigenous languages throughout early childhood. A number of Aboriginal and Torres Strait Islander children in this large-scale study were found to be multilingual with around one in five speaking more than one language by wave 4. Aboriginal and Torres Strait Islander children’s use of English (Standard Australian English or Aboriginal Australian English) was high across all waves of data collection and continued to increase until reaching 100% at wave 4. There may be a number of reasons for the high use of English by Aboriginal and Torres Strait Islander children in the study. These include the fact that English is the language of instruction in Australian schools, means that all children begin learning English at the commencement of formal schooling, if not before. Additionally, social influences such as television and social media, exposure to and need to communicate with the broader English-dominant community (especially if children are living in urban areas) may influence increased use of English among Aboriginal and Torres Strait Islander children. However, it is important to note that while all children were reported to speak English by wave 4 this does not mean it was the child’s first language. The dominant language of the child identified at wave 4 revealed that in fact some children spoke an Indigenous language as their
dominant language (meaning that English would be a second or additional language) and some were balanced bilinguals, being equally fluent in both English and an Indigenous language. The type of English that was being spoken at home also varied among families with around half reporting that they spoke Standard Australian English in their home while the other half of families in the study spoke varying degrees of Aboriginal Australian English.

**Intergenerational exchange of Indigenous languages**

The findings of the current study are in keeping with previous international literature regarding the intergenerational exchange of languages that show exposure to languages in the home environment, especially from parents or primary caregivers, is one of the most important contributors to children’s ability to speak their home language (De Houwer 2007; Lyon 1996). In the current study, 67.2% of children learned to speak an Indigenous language when their primary caregiver spoke an Indigenous language as opposed to just 6.9% who learned to speak an Indigenous language when their primary caregiver did not, demonstrating the important role of intergenerational language exchange.

**Language maintenance among Aboriginal and Torres Strait Islander children**

Over three-quarters of children in this study who learned Indigenous languages from birth maintained speaking an Indigenous language across early childhood. Various reasons for children ceasing to maintain a language have been reported previously in the literature. For example, language loss may occur if children’s exposure to an Indigenous language in the home ceases, perhaps if the person who was teaching them is no longer living in the home, or it may be because the child simply chooses not to speak an Indigenous language any more (Wong Fillmore 1991).

One major cause of home language loss or language shift to the dominant language of a society is exposure to, and use of, languages in educational environments. For example, a child may be supported to speak their Indigenous language in an early childhood education or care environment and then experience language loss when they move to and English-based educational centre which does not support bilingual development (Hornberger and King 1996). Aboriginal and Torres Strait Islander children who speak Indigenous languages are at risk of language loss due to the lack of bilingual programs supporting first language acquisition of Indigenous languages and explicit teaching of English as a second language for children who are not exposed to English in the home environment (Simpson, Caffery, and Patrick 2009).

**Personal and environmental factors associated with language maintenance in Aboriginal and Torres Strait Islander children**
Use of an Indigenous language by primary carers and children’s level of relative isolation were both found to be significantly related to language maintenance, while sex and primary caregiver concerns about speech, and ear and hearing problems were not. One quarter of primary caregivers identified language as one of the five most important aspects of Aboriginal and Torres Strait Islander culture they wanted to pass onto their children. The motivation for primary caregivers to speak an Indigenous language with their children may differ depending on the community in which children live. In urban areas primary caregivers may choose to speak an Indigenous language with their children to preserve their language and culture or to enable them to participate in cultural or community activities. In more remote areas primary caregivers may speak to children in Indigenous languages for different reasons. For example, in some remote communities in Australia, an Indigenous language would be the main language used at home. English is not the dominant language, but rather may be spoken as an additional language or not at all and would most likely be acquired later in an educational setting. The relationship between location and Indigenous language use has been established by previous studies in both Australia (McLeod, et al. 2014) and Canada (Burnaby and Beaujot 1986) and was further confirmed in the current study which found that children living in more isolated areas were more likely to maintain speaking an Indigenous language. The link between mother-tongue language maintenance and location and primary caregiver use is in keeping with previous international findings that the language spoken in the home is the most likely to be transmitted between generations and be adopted as the primary language of the next generation (Norris 2004).

The influence of speech and hearing problems on language maintenance

While there was only a small number of children in the sample who were reported to have speech and hearing concerns, given the important role of speech and hearing competence upon language learning, the relationship between these issues and language maintenance was considered. The cautionary findings of the current study suggest that primary caregiver concerns about speech did not appear to impact upon the maintenance of Indigenous languages among Aboriginal and Torres Strait Islander children. Previous research has found that when parents suspect speech and language difficulties they may avoid multiple language input as it is sometimes thought to exacerbate or be the cause of their difficulties (Baker 2011; King and Fogle 2006). However, current literature on the influence of bilingualism upon speech and language development has found no reason to cease input in multiple languages if children are experiencing speech and language difficulties (Hambly et al. 2013; Paradis et al. 2011). Secondly, additional cautionary findings of the current study suggest that there was no correlation between language maintenance and the presence of ear or hearing problems.
Aboriginal and Torres Strait Islander children are 5 times more likely to experience severe otitis media than Australian children not of Aboriginal or Torres Strait Islander descent (Gunasekera et al. 2007). A review of otitis media in Aboriginal and Torres Strait Islander children found that prevalence ranged between 1 and 67% in different Aboriginal and Torres Strait Islander communities throughout Australia with up to 67% experience conductive hearing loss at school age (Morris 1998). Previous studies of multilingual children with hearing loss have found that Australian parents of children from non-English speaking backgrounds were more likely to cease input of home language or multiple languages because of their children’s hearing loss (Crowe et al., in press). These findings are in contrast to the current study which suggests that ear and hearing problems do not appear to negatively impact upon the maintenance of Indigenous languages across early childhood.

**Limitations and future research**

While the current study makes an important contribution to understanding patterns of multilingualism and language maintenance occurring among Aboriginal and Torres Strait Islander children, conclusions from these findings should be drawn with caution. Firstly, due to the sampling framework used in the recruitment of participants to the LSIC cohorts and the grouping of all Aboriginal and Torres Strait Islander languages under the term ‘Indigenous languages’, the findings may not reflect the patterns of multilingualism and language maintenance occurring within all Aboriginal and Torres Strait Islander groups or all Indigenous languages. Additionally, the sample sizes of children with speech concerns and ear and hearing problems were small and therefore again caution must be used when drawing conclusions from these data.

Children in the current study were aged 3 to 5 years in wave 4 and therefore the impact of entering an education setting where English is the primary language of instruction up their Indigenous language maintenance was unable to be examined. Further longitudinal research using these LSIC data as children progress through primary school and into adolescence would be of great value in order to examine identifying if and when language loss occurs among Aboriginal and Torres Strait Islander children to aid in planning for language support services to facilitate language maintenance among Aboriginal and Torres Strait Islander children.

**Implications and conclusion**

In summary, the current study found that Aboriginal and Torres Strait Islander children are highly multilingual and, among those who spoke an Indigenous language, high levels of language maintenance were found across early childhood. Intergenerational exchange of languages was found to be key with children whose primary caregivers spoke an Indigenous language being significantly more likely to speak an Indigenous
language. Children from more isolated areas were found to have significantly higher levels of Indigenous language use and maintenance. Factors such as sex, speech concerns, and ear and hearing problems were not found to significantly impact upon Indigenous language maintenance.

The findings of the current study are in keeping with previous international studies regarding Indigenous language learning which highlight important role of language exposure in the home environment and the influence of location upon language learning (Burnaby and Beaujot 1986; Norris 2004). When exposure to language in the home is not possible, it is necessary to consider alternative opportunities for Aboriginal and Torres Strait Islander children to learn Indigenous languages.

Internationally, alternative opportunities for mother-tongue language learning are being explored. For example in Canada, the decline in Indigenous language learning as a first language through intergenerational exchange is being offset by the acquisition of these languages by Indigenous children as a second language in language revitalization programs run by educational and community settings (Norris 2004). Language revitalisation has also been facilitated among Indigenous populations in South America by providing exposure to and support for Indigenous language development in education settings (Hornberger and King 1996). Similarly, language and culture nests are being established in parts of Australia guidelines for schools wishing to teach Aboriginal language sand cultures are being established (Williams, 2013; Williams, 2014). (Norris 2004) suggests that language learning in both the home environment and in broader community contexts (including education) are necessary to facilitate effective intergenerational transmission of mother-tongue languages. Educators and early childhood professionals play an important role in facilitating, encouraging, and welcoming home language use and maintenance in children’s contexts outside of the home environment. Such opportunities for language exposure and use are essential to protect and facilitate the use of the 100 Indigenous Australian languages which are currently classified as severely or critically endangered (Marmion et al. 2014) and to ensure the continuation of Aboriginal and Torres Strait Islander languages and culture in future generations.
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Table 1.

*Number of languages spoken by parents and children*

<table>
<thead>
<tr>
<th>Number of languages spoken</th>
<th>Parents $(n = 580)$</th>
<th>Children $(n = 580)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wave 1</td>
<td>Wave 1</td>
</tr>
<tr>
<td>One</td>
<td>78.3%</td>
<td>84.8%</td>
</tr>
<tr>
<td>Two</td>
<td>15.3%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Three</td>
<td>4.8%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Four</td>
<td>1.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>Five</td>
<td>0.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Six</td>
<td>0.2%</td>
<td>-</td>
</tr>
<tr>
<td>Eight</td>
<td>0.2%</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 2.  
*Personal and environmental factors bivariately related to language maintenance*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Wave 1 to Wave 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maintained</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>77.6%</td>
</tr>
<tr>
<td>Female</td>
<td>74.3%</td>
</tr>
<tr>
<td>Primary caregiver spoke Indigenous language</td>
<td>84.4%*</td>
</tr>
<tr>
<td>Primary caregiver did not speak Indigenous</td>
<td>37.5%*</td>
</tr>
<tr>
<td>language</td>
<td></td>
</tr>
<tr>
<td>Concerns about speech</td>
<td>64.3%</td>
</tr>
<tr>
<td>No concerns about speech</td>
<td>78.5%</td>
</tr>
<tr>
<td>Ear and hearing problems</td>
<td>81.8%</td>
</tr>
<tr>
<td>No ear and hearing problems</td>
<td>75.6%</td>
</tr>
</tbody>
</table>

* * p < .01