

This article is downloaded from



CRO CSU Research Output
Showcasing CSU Research

<http://researchoutput.csu.edu.au>

It is the paper published as:

Author(s): Bennetts Kneebone, L. ; Bennetts Kneebone, L. ; McLeod, S.L. ; Verdon, S.E.

Title: Celebrating Indigenous Australian children's speech and language competence

Journal: Early Childhood Research Quarterly

ISSN: 0885-2006

Year: 2014

Pages:

118 - 131

Volume: 29

Issue: 2

Abstract: World-wide it is important to recognize Indigenous children's speech and language competence and their language learning environments. Indigenous Australian children participated in the child cohort of Footprints in Time: Longitudinal Study of Indigenous Children, a national study supported by Indigenous Australians and the Australian Government collected annually (in waves). There were 692 3–5-year-old children in wave 1, and two years later, 570 5–7-year-old children were in wave 3 (77.0% of children in wave 1 were also in wave 3). Data were obtained via parent interviews and direct assessment. The children spoke between one and eight languages including: English (wave 1: 91.2%, wave 3: 99.6%), Indigenous languages (wave 1: 24.4%, wave 3: 26.8%), creoles (wave 1: 11.5%, wave 3: 13.7%), foreign languages (non-Indigenous languages other than English) (wave 1: 2.0%, wave 3: 5.1%), and sign languages (wave 1: 0.6%, wave 3: 0.4%). Children who spoke an Indigenous language were more likely to live in moderate to extreme isolation than their English-speaking counterparts. Parental concern about speech and language skills was similar to data for non-Indigenous children with approximately one quarter of parents expressing concern (wave 1: yes = 13.9%, a little = 10.4%). Children's language environments were rich, with many family members and friends telling oral stories, reading books, and listening to the children read. Almost a third of families wanted to pass on their cultural language, and many indicated that they would like their child to learn an Indigenous language at school. Overall, Indigenous Australian children have rich cultural and linguistic traditions and their speech and language competence is promoted through family, community, and educational experiences.

URLs:

FT: <http://dx.doi.org/10.1016/j.ecresq.2013.11.003>

PL: http://researchoutput.csu.edu.au/R/-?func=dbin-jump-full&object_id=54595&local_base=GEN01-CSU01

Running Head: INDIGENOUS CHILDREN'S SPEECH AND LANGUAGE

Celebrating young Indigenous Australian children's speech and language competence

Sharynne McLeod

Sarah Verdon

Charles Sturt University, Bathurst, NSW, Australia

Laura Bennetts Kneebone

Department of Social Services, Canberra, ACT, Australia

Correspondence: Professor Sharynne McLeod, Ph.D.

Charles Sturt University

Panorama Ave, Bathurst, NSW, Australia

Email: smcleod@csu.edu.au

Tel: +61-2-63384463

Fax: +61-2-63384417

MANUSCRIPT ACCEPTED FOR PUBLICATION

McLeod, S., Verdon, S., & Bennetts Kneebone, L. (in press, November 2013). Celebrating Indigenous Australian children's speech and language competence. *Early Childhood Research Quarterly*.

Abstract

Worldwide it is important to recognize Indigenous children's speech and language competence and their language learning environments. Indigenous Australian children participated in the child cohort of Footprints in Time: Longitudinal Study of Indigenous Children, a national study supported by Indigenous Australians and the Australian Government collected annually (in waves). There were 692 3- to 5-year-old children in wave 1, and two years later, 570 5- to 7-year-old children were in wave 3 (77.0% of children in wave 1 were also in wave 3). Data were obtained via parent interviews and direct assessment. The children spoke between one and eight languages including: English (wave 1: 91.2%, wave 3: 99.6%), Indigenous languages (wave 1: 24.4%, wave 3: 26.8%), creoles (wave 1: 11.5%, wave 3: 13.7%), foreign languages (non-Indigenous languages other than English) (wave 1: 2.0%, wave 3: 5.1%), and sign languages (wave 1: 0.6%, wave 3: 0.4%). Children who spoke an Indigenous language were more likely to live in moderate to extreme isolation than their English-speaking counterparts. Parental concern about speech and language skills was similar to data for non-Indigenous children with approximately one quarter of parents expressing concern (wave 1: yes=13.9%, a little=10.4%). Children's language environments were rich, with many family members and friends telling oral stories, reading books, and listening to the children read. Almost a third of families wanted to pass on their cultural language, and many indicated that they would like their child to learn an Indigenous language at school. Overall, Indigenous Australian children have rich cultural and linguistic traditions and their speech and language competence is promoted through family, community, and educational experiences.

Key words: Indigenous, Aboriginal, communication, speech, language, children

Highlights

- This paper describes 692 Indigenous Australian children's language competence.
- Cross-sectional and longitudinal data are reported from 3 to 7 years of age based on parent report and direct assessment.
- Children spoke between one and eight languages: English, Indigenous languages, creoles, foreign languages, and sign languages.
- Children who spoke an Indigenous language were more likely to live in moderate to extreme isolation.
- Language environments were rich. Family members and friends told stories, read books, and listened to the children read.

Celebrating young Indigenous Australian children's speech and language competence

The acquisition of speech and language is a key aspect of development for all children. The ability to communicate enables participation within the contexts children live. In addition to the development of oral communication skills, children also acquire written communication skills in many societies. While much is known about the speech and language acquisition and competence of monolingual English-speaking children (McLeod, 2013; Oller, Oller, & Badon, 2006), less is known about children who live in multilingual and multicultural environments (Grech & McLeod, 2012), and even less is known about Indigenous children's speech and language competence (Westby & Inglebret, 2012). Indigenous people who share their lands with English-speaking people include Native Americans in the US, the First Nations People of Canada, and Aboriginal and Torres Strait Islanders in Australia. There are reports that Indigenous children in English-speaking countries are not achieving similar language and literacy benchmarks on English tasks compared with their peers. For example, Lee, Grigg, and Donhaue (2007) document that in the US, American Indian/Alaska Native children have not demonstrated the same level of achievement compared with White, Black, and Hispanic students in grades 4 and 8 over a 15-year period. The Australian Research Alliance for Children and Youth (ARACY, 2013) published a Report Card: The Wellbeing of Young Australians that highlighted the discrepancy between the health and wellbeing of Indigenous and non-Indigenous Australian children. This included evidence that poor literacy and numeracy skills significantly disadvantage Indigenous children, particularly in regard to school completion and unemployment. These benchmarking reports primarily focus on English language and learning

and do not enable reporting of the richness of Indigenous children's language learning experience and competence.

The United Nations Declaration on the Rights of Indigenous Peoples was adopted by the United Nations General Assembly in 2007. It contains 46 articles and the current paper draws on three of these:

Article 13: Indigenous peoples have the right to revitalize, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literatures...

Article 15: Indigenous peoples have the right to the dignity and diversity of their cultures, traditions, histories and aspirations which shall be appropriately reflected in education and public information...to combat prejudice and eliminate discrimination and to promote tolerance, understanding and good relations among indigenous peoples and all other segments of society.

Article 22: Particular attention shall be paid to the rights and special needs of...children and persons with disabilities in the implementation of this Declaration (United Nations, 2008, pp. 7, 9)

Consequently, this paper aims to promote understanding of Indigenous Australian children's speech and language competence and their families' and communities' aspirations and practices.

Languages of Indigenous Australians

Aboriginal and Torres Strait Islander people make up approximately 2.5% of the entire Australian population, of which 38% are children aged less than 15 years (Australian Bureau of Statistics [ABS], 2006). The rich cultural and linguistic traditions of Indigenous Australians have been widely documented and Indigenous Australian languages have been described as "storehouses of cultural knowledge and tradition" (Australian Institute of Aboriginal and Torres Strait Islander Studies [AIATSIS], 2005, p. 21). Approximately 250 Indigenous Australian languages have been described (AIATSIS, 2005; Victorian Aboriginal Corporation for

Languages [VACL], 2010). However, currently, most of Australia's Indigenous languages are "no longer fully or fluently spoken" (AIATSIS, 2005, p. 7). While currently 145 Indigenous Australian languages are spoken to some degree, 110 are severely or critically endangered, and there are less than 20 Indigenous languages that are spoken across all generations (AIATSIS, 2005; McConvell, 2008; Obata & Lee, 2010). Indigenous Australians also speak *creoles* (e.g., Kriol). Creoles began as *pidgins* by merging English and Indigenous languages to enable communication on missions and outstations. Over the years, these pidgins have developed in complexity into languages in their own right, and are learned as first languages by some children. Today, many Indigenous communities are undertaking Indigenous language revitalisation programs and some children are learning Indigenous languages that are not spoken by their parents (Obata & Lee, 2010; VACL, 2010) and additionally, new Indigenous languages are emerging from some communities (O'Shannessy, 2005).

The Australian census (ABS, 2006) recorded that 12% of the Indigenous population over the age of 5 years speak an Indigenous language at home, and 83% speak a form of English only, which may include Australian Aboriginal English (AAE). AAE differs from Standard Australian English in pronunciation, vocabulary (including the use of English words with other meanings), grammar, and sentence structure (Butcher, 2008; Eagleson, 1982; Kaldor & Malcolm, 1979, 1982, 1991; Sharpe, 1977; Williams, 2000). It is important to recognize that AAE is "a different dialect of English that is just as efficient a medium of communication [as Standard Australian English]" (Butcher, 2008, p. 625). To date, there has been limited research considering Indigenous Australian children's speech and language competence and the nature of their language environments.

Children's Language Environments

The acquisition of languages is dependent upon the interaction of a number of factors including level of exposure to languages, opportunity to use languages, and attitudes towards languages (Patterson & Pearson, 2004). Children's early models of language are largely received in their home environment (Weigel, Martin, & Bennett, 2006). Therefore, the level of language exposure that children receive from their home environment, in addition to the choices made by parents regarding multilingual acquisition, will shape their competency in the languages they speak. Parents may choose to raise their children monolingually; speaking either English or their Indigenous language, or they may choose to raise children to be multilingual, speaking either multiple Indigenous languages or a combination of Indigenous language(s) and English, or other languages including creoles, sign, or foreign languages. Parental choices for and against maintaining home languages or encouraging multilingualism are influenced by a number of factors. Parents may choose to maintain home languages to maintain cultural identity and community participation (Park & Sarkar, 2007) or because they have limited knowledge of other languages (Saravanan, 2001). Alternatively, parents may decide it is best for their child to cease using their home language and speak the dominant language of the community (in this case, English) if their home language has a comparatively low status (Dixon, Wu, & Daraghmeh, 2012) or if parents believe that use of the dominant language will increase future success in education and employment (Wong Fillmore, 1991). These choices, and therefore the patterns of language maintenance and loss, vary between language groups (Verdon, McLeod, & Winsler, 2013).

It has been well documented that support from parents and family members in the home environment through activities such as reading books and sharing stories has a positive impact upon children's language skills and their speech and language competence (Duursma, Augustyn,

& Zuckerman, 2008). These skills include phonological awareness, alphabet and vocabulary knowledge, syntax, grammar, receptive and expressive language skills, understanding of story structure, and learning to read (Bus, Van Ijzendoorn, & Pellegrini, 1995; Ehri & Roberts, 2006; Vivas, 1996). Currently, little research has been conducted into the language environments of Australian Indigenous children and their impact upon language and literacy development.

There are a number of different circumstances under which Indigenous children may be or become multilingual. Multilingual language learning for Indigenous children may be understood by considering the dimensions of language learning proposed by Paradis, Genesee, and Crago (2011). Paradis et al. (2011) juxtaposed simultaneous versus sequential language acquisition within majority versus minority ethnolinguistic communities. Indigenous people are highly mobile (Taylor & Bell, 2004), with approximately 22% of families reporting to have moved house within a one-year period (Department of Families, Housing, Community Services and Indigenous Affairs [FaHCSIA], 2012a). However, typically children moved to locations with similar levels of relative isolation. This change in context will impact upon children's ability to learn, use, and maintain languages cultural languages which may be context-specific. Indigenous children who speak Indigenous languages as their mother tongue primarily live in remote communities where the Indigenous language is still the lingua franca. According to the Paradis et al. (2011) framework, these remote children's Indigenous language learning could be described as occurring within majority ethnolinguistic communities (because they are separate from the predominantly English-speaking areas of Australia). When these Indigenous children learn English, they are likely to learn English sequentially (after they have learned their Indigenous language) at school (where Indigenous language speakers are in a minority ethnolinguistic community since English is the lingua franca of Australian schools). In contrast, urban

Indigenous children may learn an Indigenous language as a second or other language within English-speaking homes. In this instance, these urban Indigenous children are likely to be sequential language learners who have established English as their primary language, and may learn Indigenous languages within Indigenous language revival programs through their community and school. These urban Indigenous children typically live in minority ethnolinguistic communities, where Standard Australian English is spoken as the lingua franca. The highly endangered Indigenous languages maintained or revived in Australia's urban and inner regional areas do not have the advantage of extensive resources that many foreign languages have. For example, while the multilingual children who learn Arabic or Cantonese at home and then English at school can be considered to be sequential learners in minority ethnolinguistic communities, these children may have the opportunity to visit a country or community where the target language is the lingua franca (e.g., Saudi Arabia or China). In contrast, an immersion experience is extremely difficult, if not impossible, to replicate for many Indigenous languages. Many Indigenous languages are endangered and have few living speakers, particularly in urban areas. To explain further, Australia is a large country, and Indigenous languages spoken in remote regions versus urban regions are as different from one another as English versus Arabic versus Cantonese, so visiting a remote Indigenous community does not provide a relevant language learning context for urban Indigenous children since their community languages are not the same.

Most of the previous research regarding Australian Indigenous children's speech and language focuses on differences between Standard Australian English and Aboriginal English, identification of children who have speech and language difficulties in both of these dialects (difference versus disorder), and beneficial support for promoting children's speech and

language acquisition (Gould, 2008; Toohill, McLeod, & McCormack, 2012; Williams & Masterson, 2010). Additionally, numerous studies have documented the high prevalence and impact of ear diseases (e.g., middle ear infection) and hearing loss for Indigenous Australian children (Bauert, Brown, Collins, & Martin, 2001; Boswell, 1997; Gibson, Stuart, Włodarczyk, Olson, & Hensley, 1996; Power & Hyde, 2002). For example, Bauert and colleagues (2001) reported that 79% of Indigenous children tested in the Northern Territory of Australia were found to have some level of hearing loss. Williams, Coates, Pascoe, Axford, and Nannup (2009) reported that middle ear disease was identified in 42.0% of Aboriginal school children aged 4–12 years in the city of Perth, and hearing loss in 19.1% of children. Difficulty hearing can impact children's speech and language skills (McLeod & Harrison, 2009; Shriberg, Flipsen et al., 2000; Shriberg, Friel-Patti, et al., 2000; Shriberg, Friel-Patti, Flipsen, & Brown, 2000; Williams & Jacobs, 2009; Zumach, Gerrits, Chenault, & Anteunis, 2010). A large-scale study of Australian children's development in the first year of school has shown that Indigenous children are more likely than non-Indigenous children to be classified as developmentally vulnerable on the domains of (English) language and cognitive skills (Indigenous = 28.6%; non-Indigenous = 7.9%) and communication skills and general knowledge (Indigenous = 21.3%; non-Indigenous = 8.6%) (Centre for Community Child Health and Telethon Institute for Child Health Research, 2009). There is a need for research to describe the speech and language competence of Indigenous Australian children in all of the languages they speak (not only English) and the cultural and linguistic environment provided by their families and communities. The current study aims to meet this need.

Context of the Current Study

Footprints in Time: The Longitudinal Study of Indigenous Children (LSIC, FaHCSIA, 2012a, 2012b) is the first national longitudinal study to examine the lives of Indigenous Australian children. The aim of the study “is to provide high quality data that can be used to provide a better insight into how a child’s early years affect their development. It is hoped that this information can be drawn upon to help close the gap in life circumstances between Indigenous and non-Indigenous Australians” (FaHCSIA, 2012b, p. 7). LSIC is supported by Indigenous Australians and has been initiated, funded, and managed by the Australian Government. Data have been collected about children, their families, communities, and services and to date, over 1,750 Indigenous Australian children and their families have participated in LSIC.

In addition to LSIC, the Australian Government has funded the Longitudinal Study of Australian Children (LSAC). LSAC is a separate national study designed to be representative of all children within the Australian population based on characteristics from the 2001 Australian Bureau of Statistics Census data. Recruitment ensured proportional geographic representation of 5,000 children aged 4 to 5 years in the Kindergarten cohort and 5,000 infants in the Birth cohort in each of the eight states and territories of Australia. Comprehensive details on the design and sampling of LSAC are available from Soloff, Lawrence, Mission, and Johnstone (2006) and four waves of bi-annual data currently are available. In the discussion of the current paper, language data are compared for children in the Child cohort of the LSIC study and children in the Kindergarten cohort of LSAC.

Study Aims

The present study sought to describe the speech and language competence of a large geographically diverse sample of Indigenous Australian children aged 3 to 7 years by drawing on two sources of information (parent report and direct assessment) across two waves of data collection (cross-sectionally and longitudinally). The aims of the present investigation were:

1. To describe the languages spoken by Indigenous Australian children as reported by parents.
2. To describe the speech and language competence of Indigenous Australian children as reported by parents and direct assessment.
3. To describe the language environment of Indigenous Australian children as reported by parents.
4. To identify the extent of parental concern about Indigenous Australian children's hearing, speech, and language skills.

Because this is the first large-scale study outlining Indigenous Australian children's language competence, both cross-sectional and longitudinal data are described. It was considered to be important to include cross-sectional information about all of the children who participated in wave 1 ($n = 692$) and wave 2 ($n = 570$) of the LSIC study to ensure the richness of children's experiences were documented. In addition, where appropriate, longitudinal comparisons are made for the 533 children who were present in both waves of data collection.

Method

Participant Recruitment

Identification of Indigenous Australians within the LSIC was undertaken by two Australian Government departments: Medicare and Centrelink. A "non-representative purposive sampling design" was implemented across 11 sites with "approximately equal representation of

urban, regional and remote areas” (FaHCSIA, 2009, p. 9) in six of the eight states and territories in Australia (i.e., excluding Tasmania and the Australian Capital Territory). The representation of Indigenous children aged 0 to 5 years within LSIC is consistent with estimates from the Australian Bureau of Statistics for Australia. (FaHCSIA, 2009). The recruitment strategy for wave 1 was to include approximately 150 Aboriginal and Torres Strait Islander children from each of eleven sites, aiming for a sample of 1,750 children. The LSIC research administration officers invited Indigenous people to participate using a snowballing strategy to increase participation.

A total of 1,687 children were recruited in wave 1 within two cohorts: the Baby cohort ($n = 960$) and Child cohort ($n = 727$). The largest tribal groups or clans represented within the sample were: Wiradjuri, Arrernte, Yorta Yorta, and Gamilaraay. At the time of writing, four waves of longitudinal data were available, with more waves of data collection scheduled. In waves 1 and 3, extensive information about the children's speech and language skills was collected; whereas less information about language was collected at wave 2. Therefore only data from waves 1 and 3 have been analysed in the current study. The children included within the present study were from the Child cohort, and were between 3- to 5-years-old in wave 1 ($n = 692$) and between 5- to 7-years-old in wave 3 ($n = 570$). Children within the Child cohort who were outside of these age ranges were excluded. That is, there were 98 of the 727 children in wave 1 whose ages were not within the 3- to 5-year age range, and 21 of the 591 children in wave 3 whose ages were not within the 5- to 7-year age range, and they were not included in the current study. In each of the waves, the “parent who knows the Study Child best” (FaHCSIA, 2012b, p. 16) was interviewed to provide information about the study child. These people are

described as parent 1 (P1). Additional details on the LSIC design and entire sampling characteristics are available from FaHCSIA (2012b).

Participants

Wave 1: Children. The participants from wave 1 of the Child cohort of LSIC who were included in the present study were 692 3- to 5-year-old children. The average age of the children was 51.0 months ($SD = 5.4$; range = 3;0-5;9). There were 354 (51.2%) boys and 338 (48.8%) girls. All of the children were identified by P1 as Indigenous Australians. Specifically, the majority were identified as Aboriginal ($n = 608$, 87.9%), with the remainder being identified as Torres Strait Islander ($n = 50$, 7.2%), or both ($n = 34$, 4.9%). Approximately half ($n = 375$, 54.2%) of the children were described by P1 as being identified with a tribe, language group, or clan. This finding corresponds with previous large-scale research undertaken in the National Aboriginal and Torres Strait Islander Social Survey, 2008, which reported that 49% of Aboriginal and Torres Strait Islander children identified with a tribe, language group or clan (Australian Bureau of Statistics, 2012). LSIC children may have slightly higher identification with a tribe, language group or clan as remote areas are more represented than in previous research (Australian Bureau of Statistics, 2012). Due to displacement and relocation of Australian and Indigenous children and adults in the past, many people are no longer living near their clan/tribe and some do not know their clan/tribe.

The children's socio-economic status was calculated using the Australian Bureau of Statistics Socio-Economic Index for Areas (SEIFA) Decile of Relative Socio-economic Advantage and Disadvantage (Australian Bureau of Statistics, 2008) that was derived from Census variables related to both advantage and disadvantage (e.g., income, educational attainment, employment). The majority of children lived in communities with postcodes that are

ranked as being the lowest three deciles within Australia (decile 1: $n = 258$, 37.3%; decile 2: $n = 76$, 11.0%, decile 3: $n = 76$, 11.0%) with few living in communities with postcodes that are ranked as being in the highest three deciles (decile 8: $n = 22$, 3.2%; decile 9: $n = 19$, 2.7%, decile 10: $n = 2$, 0.3%). The total number of people in the children's households ranged from 2 to 22 people ($M = 5.1$, $SD = 2.3$). The children's level of remoteness was determined on a five-point scale, called the Level of Relative Isolation (Zubrick et al., 2004) that is an extension of the 18-point ARIA+ (Accessibility/Remoteness Index of Australia) a measure "based on road distance measurements from over 12,000 populated localities to the nearest Service Centres in five categories based on population size" (Australian Population and Migration Research Centre, 2013). According to Zubrick et al. (2004), there are five levels of isolation: none (capital city, ARIA range 0-0.2), low (ARIA range 0.2-8), moderate (ARIA range 8-13), high (ARIA range 13-17), and extreme (ARIA range 17-18). The children's level of relative isolation was classified as: none ($n = 166$, 24.0%), low ($n = 360$, 52.0%), moderate ($n = 100$, 14.5%), high or extreme ($n = 66$, 9.5%) (the high and extreme categories were combined as individual data for the high and extreme categories is not typically released due to relatively small numbers).

The children in wave 1 were between 3 and 5 years of age, so most had not commenced formal schooling. The study children attended the following education settings: "playgroup or baby group" (typically informal care for infants) ($n = 218$, 31.5%), "childcare, day care, or family day care" ($n = 176$, 25.4%), and "preschool, kinder, or school" ($n = 365$, 52.7%). Specifically, the children who attended "preschool, kinder, or school" were further specified as: "year one in school" ($n = 15$, 2.2%), "pre-year one program in a school" ($n = 104$, 15.0%), "preschool program in a school" ($n = 102$, 14.7%), "preschool program in a non-school centre" ($n = 124$, 17.9%), "mobile preschool" (a travelling preschool program provided to children in

remote communities) ($n = 6$, 0.9%), don't know/other/missing ($n = 14$, 2.0%). Overall, the health of most of the children was described by P1 as excellent ($n = 270$, 39.0%) or very good ($n = 227$, 32.8%); while the remaining children's health was described as good ($n = 169$, 24.4%), fair ($n = 20$, 2.9%), poor ($n = 1$, 0.1%), don't know ($n = 2$, 0.3%), other ($n = 3$, 0.4%). These findings differed from the nationally representative findings from LSAC on the same question, in which parents reported their child's overall health as: excellent (60.5%), very good (26.3%), good (10.1%), fair (2.8%), and poor (0.3%). Eleven (1.6%) of the children were described by P1 as having a disability. In wave 1, no further questions were asked about the specific type of disability or developmental delay.

Wave 1: Adult informants (P1). In wave 1, P1 was primarily female ($n = 673$, 97.3%) and ranged in age from 18 to 65 years ($M = 31.5$ years, $SD = 7.4$). The majority identified themselves as Aboriginal ($n = 519$, 75.0%), while the remainder identified themselves as Torres Strait Islander ($n = 56$, 8.1%), both ($n = 19$, 2.7%), or neither ($n = 98$, 14.1%). The study child's relationship to P1 was identified. The majority of the study children were P1's son ($n = 332$, 48.0%), daughter ($n = 311$, 44.9%), or grandchild ($n = 26$, 3.7%); however, others were their niece/nephew ($n = 16$, 2.4%), step child ($n = 3$, 0.4%), adoptive/foster child ($n = 2$, 0.4%), cousin ($n = 1$, 0.1%), or other ($n = 1$, 0.1%).

Wave 3: Children. The participants from wave 3 of the Child cohort of LSIC who were included in the present study were 570 5- to 7-year-old children. The majority of children in wave 3 were also within the wave 1 sample ($n = 533$, 77.0%). These children formed the subsample upon whom the longitudinal analyses were based (see below). Of the 570 children in wave 3, there were 159 children in wave 1 who did not participate in wave 3, and 37 new children in wave 3. A comparison between demographic data for the children in wave 1 who

were missing in wave 3 and the children in both waves 1 and 3 is outlined in the description of the longitudinal subset below. The average age of the children in wave 3 was 73.3 months ($SD = 5.5$; range = 5;0-7;6). There were 291 (51.1%) boys and 279 (48.9%) girls. As in wave 1, the majority were identified as Aboriginal ($n = 507$, 88.9%), with the remainder being identified as Torres Strait Islander ($n = 36$, 6.3%), or both ($n = 27$, 4.7%). In wave 3, P1 was not asked to specify whether or not the children identified with a tribe, language group, or clan. The children's socio-economic status was calculated using the SEIFA Decile of Relative Socio-economic Advantage and Disadvantage (Australian Bureau of Statistics, 2008). Similar to wave 1, the majority of children lived in areas of disadvantage; that is, they lived in communities with postcodes that are ranked as being the lowest three deciles within Australia (decile 1: $n = 241$, 42.3%; decile 2: $n = 64$, 11.2%, decile 3: $n = 56$, 9.8.0%) with few living in communities with postcodes that are ranked in the highest three deciles (decile 8: $n = 25$, 4.4%; decile 9: $n = 13$, 2.3%, decile 10: $n = 0$, 0.0%). The total number of people in the children's households ranged from 2-19 ($M = 5.2$, $SD = 2.1$). The children's level of relative isolation (Zubrick et al., 2004) was classified as: none ($n = 145$, 25.4%), low ($n = 292$, 51.2%), moderate ($n = 65$, 11.4%), or high/extreme ($n = 68$, 11.9%).

Typically in Australia, children attend their first year of formal schooling when 5 to 6 years of age. In wave 3, the study children attended school and were in the following grades: first year of formal schooling (e.g., kindergarten/ prep/ transition) ($n = 309$, 54.2%), year 1 ($n = 234$, 41.1%), year 2 ($n = 13$, 2.3%). The type of schooling or grade was not specified for 14 children.

Overall, the children's health was described by P1 as excellent ($n = 218$, 38.2%), very good ($n = 205$, 36.0%), good ($n = 131$, 23.0%), fair ($n = 13$, 2.3%), or poor ($n = 3$, 0.5%). Seventeen (3.0%) of the children were described by P1 as having a disability. Of these 17

children, more were identified by P1 as having a disability in speech ($n = 6$, 1.1%) and Autism spectrum disorder (6, 1.1%) than any other area (i.e., physical, neurological, psychiatric, other). Twenty five (4.4%) of the children were described by P1 as having a developmental delay. Of these 25 children, more were identified as having a developmental delay in speech ($n = 13$, 2.3%) than any other area (i.e., cognitive, behavioral, physical, other).

Wave 3: Adult informants (P1). In each of the waves of data collection, the LSIC researchers aimed to interview the same informant (P1) for each child; 536 (94.0%) were the same in both wave 1 and 3. Similar to wave 1, in wave 3 P1 was primarily female ($n = 553$, 97.0%). The P1s ranged in age from 19 to 68 years ($M = 33.9$ years, $SD = 7.9$). The majority identified themselves as Aboriginal ($n = 428$, 75.1%), while the remainder identified themselves as Torres Strait Islander ($n = 41$, 7.2%), both ($n = 12$, 2.1%), neither ($n = 87$, 15.3%), or other ($n = 2$, 0.4%). The study child's relationship to P1 was identified again in wave 3. The majority of the study children were P1's son ($n = 265$, 46.5%), daughter ($n = 254$, 44.6%), or grandchild ($n = 28$, 5.0%); however, others were their niece/nephew ($n = 17$, 2.9%), step child ($n = 2$, 0.4%), adoptive/foster child ($n = 1$, 0.2%), cousin ($n = 1$, 0.2%), and other ($n = 2$, 0.4%).

Waves 1 and 3: Children in the longitudinal subset. There were 692 children in wave 1 and 570 children in wave 3. Of these, 533 children were present in both waves 1 and 3 and where appropriate, longitudinal analyses were undertaken on data from these children. There were 159 children who were in wave 1 and not wave 3. Demographic data were compared for the 533 children who were present in both waves 1 and 3 and the 159 children who were present in wave 1 but not wave 3. These analyses were undertaken for gender, SEIFA Advantage/Disadvantage, parental concerns about child's speech on the PEDS, and number of languages spoken to determine if there were significant differences between the two groups. No significant

difference between the groups was found for gender (wave 1 & 3: male = 52.2%, female = 47.8%; wave 1 not 3: male = 47.8%, female = 52.2%) ($\chi^2(1) = .93, p = .34$), SEIFA Advantage/Disadvantage (wave 1 & 3 $M = 3.0, SD = 3.1$; wave 1 not 3 $M = 2.6, SD = 2.8$) ($t(690) = 1.33, p = .18$), or parental concerns about speech on the PEDS ($\chi^2(2) = 3.16, p = .21$). However, children present in wave 1 but not wave 3 used significantly more languages ($M = 1.43, SD = .87$), than children who were present at both waves 1 and 3 ($M = 1.22, SD = .56$), $t(690) = -3.7, p < .000$.

Procedure

Parent report and direct assessment of the child were used to describe speech and language competence. The interviews and assessments were conducted predominantly by Aboriginal and Torres Strait Islander research administration officers who were employed by the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA, now called Department of Social Services, DoSS). While a small proportion of interviews were conducted by non-Indigenous interviewers in wave 1, subsequent waves have been conducted solely by Indigenous interviewers. Training was conducted for each wave of data collection at FaHCSIA/DoSS offices in Canberra, Australia and subsequently further training was provided in the field. Interviewers were trained to initially ask questions verbatim as they were written, using the alternative text if available (some Aboriginal English alternatives were agreed upon after pilot studies) and a very small number of interviews were translated as they were conducted.

Parent report. A series of parent-report questions were developed and piloted in conjunction and consultation with linguists and Indigenous interviewers involved in the study to determine children's speech and language use, competence, and environments. Questions

deemed appropriate were included in data collection. For example, the following question was asked to determine the languages spoken by P1, P2, and the study children: "Looking at the card, which language or languages does [P1, P2, study child] speak? Say the language and the number from the card." Then for each language, the parents were asked "How well does [P1, P2, study child] speak this language?" and were provided with the following options: "Main language. Speaks alright. Some words only. Other (please specify). Don't know." In addition, P1 was asked whether they, or another family member, had undertaken a range of activities with the study child in the last week, including reading books, cooking, and swimming. If so, they were asked whether the activity was undertaken in an Indigenous language. In wave 3, P1 was asked which aspects of Aboriginal and Torres Strait Island culture they would like to pass onto the study child and could select five options from the following list of 12: (1) knowing country, (2) family history, (3) singing, music, and dance, (4) painting or weaving, (5) traditions and ceremony, (6) speaking language, (7) bush tucker (food sourced from native Australian plants and animals), hunting, fishing, (8) family networks, (9) story-telling and yarning, (10) pride in identity, (11) showing respect, and (12) spiritual beliefs.

In waves 1 and 3, interviewers sought information about the children's hearing history and status. Parents were asked whether the study child had ever had a series of ear and hearing-related problems. Specifically they were asked "I would like to ask about any health problems (study child) might have had. Has (study child) ever had any problems with ears or hearing" and answers were coded by interviewers into the following multiple response categories: (1) "runny ears (glue ear, tropical ear, chronic suppurative otitis media, ear infections, middle ear infection, fluid in ears, may have needed grommets)," (2) "perforated ear drum (hole in ear drum)," (3)

“total deafness,” (4) “deaf in one ear,” (5) “hearing loss partially deaf,” (6) “other ear problem.” Each category was described separately in the analysis (see Table 3).

In both waves of data collection, the P1s were asked a series of questions about their concerns about their children's speech and language. Two of these questions were adapted (with permission) from the Parent's Evaluation of Developmental Status (PEDS, Glascoe, 2000). Specifically the word “concerns” was replaced by the word “worries”:

1. “Do you have any worries about how your child talks and makes speech sounds?”
2. “Do you have any worries about how your child understands what you say to him/her?”

The PEDS is reported to have good sensitivity, specificity, and concurrent validity (Coghlan, Kiing, & Wake, 2003; Glascoe, 1994, 1996). These questions on the PEDS have been used to identify Australian parents' concerns in other studies including the Longitudinal Study of Australian Children (McLeod & Harrison, 2009) and the Sound Effects Study (McLeod, Harrison, McAllister, & McCormack, 2013). McLeod et al. (2013) found that when parents indicated “yes” or “a little” in response to the question about “concerns about how your child talks and makes speech sounds” 86.7% of these children achieved a standard score below the normal range on the Diagnostic Evaluation of Articulation and Phonology (Dodd, Hua, Crosbie, Holm, & Ozanne, 2002). Within the LSIC study, the two PEDS questions listed above were used to screen for further details about the areas of speech and language difficulty. If some level of concern was indicated, parents were then asked to identify if the problem was in any one of a list of areas. In wave 3, parents were also asked to report their use of services to support their child's speech and language skills.

Direct assessment. In waves 1 and 3 of data collection, the children were assessed using the Renfrew Word Finding Vocabulary Test (Renfrew, 1995). The Renfrew Word Finding

Vocabulary Test assesses expressive vocabulary using 50 pictures that are organized in order of difficulty. It was developed for use in the UK, and the fourth edition was created by running trials in England, Scotland, Ireland, Australia, and South Africa. The Australian Council for Educational Research (ACER, 2009) prepared a report on the use of the Renfrew Word Finding Vocabulary Test with children in wave 2 of the LSIC sample and found that there was a positive, moderate correlation ($r = .48$, $p < .001$) between scores on the Renfrew Word Finding Vocabulary Test and the Who Am I? test (De Lemos & Doig, 1999), a developmental test of school readiness.

During each wave of LSIC data collection, the Renfrew Word Finding Vocabulary Test primarily was administered by Aboriginal and Torres Strait Islander Research Administration Officers (RAOs). The children could name the word in English, or another language. The RAOs wrote the response of the child to each of the pictures, and these responses were scored by researchers at ACER. “[A]rticulation errors or minor corruptions or substitutions were scored as correct” (ACER, 2009, p. 2). For example, for the target word *violin* children was scored correctly if they said “fiddle” but were not correct if they said “guitar” (ACER, 2009). Each time the children named a picture accurately they achieved one point to create a total score out of 50.

The children's scores on the Renfrew Word Finding Vocabulary Test could not be compared with normative data for three reasons. First, since this test was developed in the UK, there are no normative data for Australian children, and second there are no normative data for naming test items in languages other than English. Additionally, there was a significant effect of level of isolation on children's performance according to the ACER (2009) who reported on 587 children in wave two of LSIC: “... children who lived in easily accessible areas scored

significantly higher, on average, than children who lived in areas rated as low/moderate and high/extreme on the isolation" (p. 7).

Data Analysis

Responses from P1 and direct assessment scores were analysed using the IBM SPSS Statistics computer program version 20 (IBM, 2011). These data were analysed using descriptive statistics to determine the frequency of responses for binomial variables (n and %) or for continuous variables (M and SD). Mean or proportion testing to identify relationships that existed between variables were undertaken using Chi square analyses, t tests, and Analysis of Variance (ANOVA).

Results

Languages Spoken by the Children

The languages spoken by the children were analyzed in four ways: (1) as a description of all children in wave 1, (2) as a description of all children in wave 3, (3) by comparing children's language use with level of relative isolation, and (4) as a longitudinal analysis of language use for children present in both waves 1 and 3.

Languages spoken at wave 1 (3- to 5-years-old). In wave 1, the children were reported to speak between one and eight languages. While the majority of children spoke one language ($n = 557$, 80.5%), the total number of languages spoken by the remaining children was: two ($n = 99$, 14.3%), three ($n = 29$, 4.2%), four ($n = 3$, 0.4%), five ($n = 3$, 0.4%), or eight ($n = 1$, 0.1%). The majority of children in wave 1 were reported to speak English as their dominant language ($n = 566$, 81.8%); however, a number of children were reported by P1 to be equally fluent in English and an Indigenous language ($n = 25$, 3.6%), or were dominant in an Indigenous language ($n = 99$, 14.3%). Two (0.3%) answered that they did not know the dominant language of the study child.

In wave 1, almost all of the children ($n = 631$, 91.2%) spoke English, with 575 (83.1%) speaking English as their main language, 29 (4.2%) speaking English “alright”, and 24 (3.5%) using some words only. Approximately one quarter ($n = 169$, 24.4%) of the children spoke at least one Indigenous language. The total number of Indigenous languages spoken by the study children in wave 1 was: one ($n = 90$, 13.0%), two ($n = 15$, 2.2%), three ($n = 1$, 0.1%), four ($n = 3$, 0.4%), or seven ($n = 1$, 0.1%). Djambarrpuyngu was spoken as the main language by 35 (5.1%) children, Arrernte was spoken as the main language by 5 (0.7%) children, and the following six Indigenous languages were spoken as the main language by one or two children: Anindilyakwa, Galpu, Gurindji, Kalaw Kawaw Ya/Kalaw Lagaw Ya, Luritja, and Murrinh Patha. Two children spoke “other Indigenous languages” as their main language. The following 15 Indigenous languages were spoken “alright” by three or fewer children: Adnymathanha, Arrernte, Dhalwangu, Dhangu, Galpu, Gumatj, Kalaw Kawaw Ya/Kalaw Lagaw Ya, Kukatha, Kunwinjku, Pitjantjatjara, Tiwi, Walmajarri, Wardaman, Warlpiri, and Wiradjuri. Additionally, children could speak “some words only” for 41 Indigenous languages. Some of the children in wave 1 spoke at least one creole. Seventy-five (10.8%) children spoke one creole and five (0.7%) spoke two creoles. Kriol was spoken as the main language by 37 (5.3%) of the study children and Torres Strait Creole was spoken as the main language by 27 (3.9%) children. Fourteen (2.0%) spoke a foreign language (a non-Indigenous language other than English) and four (0.6%) used sign language (one child used both a foreign language and sign language). None of the children who spoke a foreign language or sign language also spoke an Indigenous language.

Languages spoken at wave 3 (5- to 7-years-old). In wave 3, cross-sectional analysis of P1 report revealed that the children were reported to speak up to four languages. While most of the study children spoke one language ($n = 391$, 68.6%), others spoke: two ($n = 139$, 24.4%),

three ($n = 34$, 6.0%), four ($n = 6$, 1.1%). Almost all of the children spoke English ($n = 568$, 99.6%) with 464 (81.4%) speaking English or Aboriginal English as their main language, 54 (9.4%) speaking English “alright”, 27 (4.7%) using some words only, and there were missing data for 25 (4.5%) children. Just over one quarter of the children spoke at least one Indigenous language ($n = 153$, 26.8%). The total number of Indigenous languages spoken by the study children in wave 3 was: one ($n = 78$, 13.7%), two ($n = 17$, 3.0%), or three ($n = 1$, 0.2%). Djambarrpuyngu was spoken as the main language by 21 (3.7%) children, and the following Indigenous languages were spoken as the main language by one or two children: Arrernte, Anindilyakwa, Galpu, Kalaw Kawaw Ya/Kalaw Lagaw Ya, Luritja, Meriam Mir, and Warlpiri. The following Indigenous languages were spoken “alright” by five or fewer children: Arrernte, Bardi, Gangalidda, Gooniyandi, Kalaw Kawaw Ya/Kalaw Lagaw Ya, Meriam Mir, Ngarinyin, Ngarrindjeri, Nyikina, Walmajarri, Warlpiri, Warumungu, Wiradjuri, and Yawuru. Additionally, children could speak “some words only” for 35 Indigenous languages and/or language groups. Creoles were spoken by some of the study children in wave 3; some spoke one creole ($n = 76$, 13.3%), and others spoke two creoles ($n = 2$, 0.4%). Kriol was spoken as the main language by 27 (4.7%) of the study children in wave 3. Torres Strait Creole was spoken as the main language by 36 (6.3%) children. Twenty nine (5.1%) children in wave 3 spoke a foreign language and two (0.4%) used sign language.

In wave 3, P1 was asked about the kind of English spoken at home. The majority of homes ($n = 293$, 51.4%) used only English words (and “would sound the same as non-Indigenous people”). Over a quarter ($n = 167$, 29.3%) used English words that were sometimes mixed with a few Aboriginal and Torres Strait Islander words (i.e., “would not be too hard for a non-Indigenous speaker to understand”). The remainder ($n = 109$, 19.1%) used English mixed

with lots of Aboriginal and/or Torres Strait Islander words (i.e., “might be difficult for a non-Indigenous speaker to understand”).

Longitudinal comparison between languages spoken by children at waves 1 and 3.

There were 533 children present in both wave 1 and wave 3 (77.0% of the entire sample). The language use of these children was compared between waves. The total number of languages spoken by the children present in both waves at wave 1 was: one ($n = 446$, 83.7%), two ($n = 64$, 12.0%), three ($n = 19$, 3.6%), four ($n = 2$, 0.4%), or five ($n = 2$, 0.4%). The total number of languages spoken by the children present in both waves at wave 3 was: one ($n = 378$, 70.9%), two ($n = 116$, 21.8%), three ($n = 33$, 6.2%) or four ($n = 6$, 1.1%). Approximately one quarter ($n = 148$, 27.7%) of the children in the sample spoke an Indigenous language at either wave 1, wave 3, or both waves. Of these children who spoke an Indigenous language at some time point, 63.5% ($n = 94$) spoke an Indigenous language at both waves 1 and 3, 12.1% ($n = 18$) children spoke an Indigenous language at wave 1 only, and 24.3% ($n = 36$) spoke an Indigenous language at wave 3 only. There was a significant relationship between those who spoke an Indigenous language at wave 1 and those who spoke an Indigenous language at wave 3 ($\chi^2(1) = 272.560$, $p < .001$). Of the children who spoke an Indigenous language at wave 1, 83.9% ($n = 94$) maintained speaking an Indigenous language at wave 3, however, the other 17% had ceased using their Indigenous language by wave 3.

The Speech and Language Competence of Indigenous Australian Children

At waves 1 and 3, study children's expressive vocabulary was tested using the Renfrew Word Finding Vocabulary Test (Renfrew, 1995). Children were asked to name pictures and could provide a response to items in English or another language if appropriate. In wave 1, the 692 children achieved an average score of 18.0 ($SD = 8.5$, range = 0-43) and in wave 3, the 570

children achieved an average score of 30.6 ($SD = 8.9$, range = 0-50). In wave 1, 27 children (3.8%) named between 1 and 10 pictures in a language other than English, with the majority of these ($n = 12$) naming only one word in a different language. In wave 3, 25 children (4.6%) named between 1 and 15 pictures in a language other than English, with the majority of these ($n = 8$) naming only one word in a different language. For the children who were present at both wave 1 and 3 ($n = 533$), scores on the Renfrew Word Finding Vocabulary Test significantly increased from wave 1 ($M = 18.69$, $SD = 8.58$) to wave 3 ($M = 31.02$, $SD = 8.62$) using a paired-samples t test $t(397) = -31.65$, $p < .000$, as would be expected due to language growth during this period.

While it is not appropriate to compare each child's scores with the normative data provided by Renfrew (1995) for 540 children living in southern UK, it can be useful to indicate benchmark figures. Renfrew (1995) indicated the age equivalence for a score of 18 was 3;5-3;6 (males) and 3;4-3;5 (females) and the age equivalence for a score of 30 was 4;11-5;2 (males) and 5;2 (females). Thus, the mean scores achieved by the children in the LSIC sample were similar to the scores for 3-year-olds and 5-year-olds within the test manual. However, the preface in Renfrew (1995) indicates that subsequent studies undertaken in South Africa and Manchester (UK) have found that children achieved lower scores than the normative data provided in the manual.

Language-Learning Environment

The children's language-learning environment is described in seven ways: (1) the impact of the level of relative isolation, (2) the languages spoken by P1, (3) oral story telling, (4) reading, writing, and numeracy, (5) additional activities including those undertaken while using

Indigenous languages, (6) parents' wishes regarding aspects of language and culture they wished to be passed onto their children, and (7) parents' wishes regarding language learning at school.

Languages spoken compared with level of relative isolation.

The languages spoken by the children were compared with their level of relative isolation (Zubrick et al., 2004) (see Table 1). In both waves 1 and 3, children who spoke English were found across all levels of isolation (see Table 1). To examine whether those who spoke English were more likely to live in levels of isolation the ordinal Level of Relative Isolation (LORI) variable (1 = none, 2 = low, 3 = moderate, 4 = high/extreme) was treated as continuous, and a one-way ANOVA was undertaken comparing level of relative isolation with whether or not the child spoke English. Those who spoke English were less isolated ($M = 1.9$, $SD = 0.8$) than those who did not speak English ($M = 3.3$, $SD = 0.5$), $F(1, 690) = 140.41$, $p < 0.01$. On average, children who spoke English were likely to live in areas of low isolation whereas children who did not speak English were likely to live in areas of high/extreme isolation. The analysis was again undertaken to determine whether a relationship was present between speaking an Indigenous language and level of relative isolation. Those who did speak an Indigenous language were more isolated ($M = 2.9$, $SD = 0.9$) than those who did not speak an Indigenous language ($M = 1.8$, $SD = 0.7$), $F(1, 690) = 263.07$, $p < 0.01$. Thus, children who spoke an Indigenous language were likely to live in higher levels of isolation; whereas children who did not speak an Indigenous language were likely to live in areas of less isolation (none or low). Finally, the relationship between speaking a foreign or sign language and level of relative isolation was also examined. A one-way ANOVA showed that children who spoke a foreign or sign language were less isolated ($M = 1.4$, $SD = 0.4$) than those who did not speak a foreign or sign language ($M = 2.1$, $SD = 0.9$), $F(1, 690) = 17.42$, $p < 0.01$. In summary, children who spoke an Indigenous

language were more likely to live in levels of moderate to high/extreme isolation. In contrast, children who spoke English or a foreign or sign language lived in areas that were not as isolated.

Expressive vocabulary and relative isolation. Whether Renfrew Word Finding Vocabulary varied as a function of relative isolation was examined using a one-way Analysis of Variance (ANOVA). In both waves 1 and 3, there was a statistically significant effect of level of isolation on performance (wave 1: $F(3, 688) = 16.11, p < .001$; wave 3: $F(3, 566) = 6.24, p < .001$). A post-hoc Tukey HSD revealed that at wave 1, scores from children in high/extreme levels of isolation ($M = 8.2; SD = 11.2$) were not significantly different from children living in moderate level of isolation ($M = 6.6; SD = 11.9$), and scores for children living in low levels of isolation ($M = 14.0; SD = 12.6$) were not significantly different from children living in area of no isolation ($M = 16.1; SD = 12.7$), but all other categories differed significantly. The major difference in scores on the Renfrew Word Finding Vocabulary Test occurred between the low and moderate levels of isolation. At wave 3, the scores of children living in moderate levels of isolation ($M = 21.6; SD = 14.3$) were significantly lower when compared with children living in areas of either low ($M = 28.8; SD = 13.4$) or no isolation ($M = 28.5; SD = 13.4$).

Languages spoken by parent 1 (P1). In wave 1, the majority of P1s spoke one language ($n = 522, 75.4\%$), 107 (15.5%) spoke two languages, 43 (6.2%) spoke three languages, 15 (2.2%) spoke four languages, 1 (0.1%) spoke five languages, 1 (0.1%) spoke seven languages, and 3 (0.4%) spoke eight languages. P1s' dominant language was listed as English ($n = 538, 77.7\%$), Indigenous languages ($n = 69, 10.0\%$), equally fluent in English and an Indigenous language ($n = 84, 12.1\%$), or other ($n = 1, 0.1\%$). A total of 641 (92.6%) spoke English, 194 (28.0%) spoke an Indigenous language, and 16 (2.3%) spoke a foreign language. The most common Indigenous languages or Creoles used by P1 at wave 1 were Kriol ($n = 64, 9.2\%$), Djambarrpuynngu ($n = 36,$

5.2%), Torres Strait Creole ($n = 36$, 5.2%), Kalaw Kawaw Ya/Kalaw Lagaw Ya ($n = 27$, 3.9%), and Arrernte ($n = 9$, 1.3%). As expected, there was a significant association between languages spoken by P1 and the languages spoken by their children ($\chi^2(1) = 500.98$, $p < .001$). If P1 spoke an Indigenous language at wave 1, then 83.0% ($n = 161$) of children also did; but 17.0% ($n = 33$) did not. If P1 did not speak an Indigenous language at wave 1, then 98.4% ($n = 490$) of children also did not. Interestingly there were 1.6% ($n = 8$) children in wave 1 who spoke an Indigenous language when P1 did not.

Oral story telling. The richness of children's language learning environment across both waves is shown in Table 2. In both waves, P1 was asked whether or not family members and friends had told an oral story ("not from a book") to the study child in the last week. In wave 1, the majority of children ($n = 498$, 72.0%) had been told an oral story by at least one person in the last week and of these, 47 (9.8%) were told a story in an Indigenous language. Similarly, in wave 3, the majority of children ($n = 401$, 70.4%) had been told an oral story by at least one family member in the last week and of these, 34 (8.5%) were told a story in an Indigenous language. Across both waves, the children were told oral stories by their mothers, fathers, siblings, grandparents, aunts, uncles, cousins, friends, teachers/carers, and others (see Table 2). The continuation of oral story telling across the early years was considered in a longitudinal analysis for the 533 children who were present both in waves 1 and 3. There was a significant relationship between the two waves ($\chi^2(1) = 14.2$, $p = .00$), with 74.9% of children who were told oral stories at wave 1 also being told oral stories at wave 3. There were 25.1% of children who were no longer told oral stories at wave 3; however, this may have been because of the increase in using books during story telling when the children were 5- to 7-years-old (wave 3).

Reading, writing, and numeracy.

In wave 1, over a third of the children had more than 30 children's books in their homes ($n = 270, 39.0\%$), while others had none ($n = 51, 7.4\%$), 1-5 books ($n = 102, 14.7\%$), 6-10 books ($n = 91, 13.2\%$), 11-20 books ($n = 90, 13.0\%$), or 21-30 books ($n = 79, 11.4\%$). P1 indicated whether or not family members or others had read a book to the study child in the last week. In wave 1, the majority of children ($n = 547, 79.0\%$) had been read to by at least one family member in the last week and of these, 24 (4.4%) were read a story in an Indigenous language. In wave 3, P1 indicated whether or not someone had read a book to the study child during the last week. The majority of children ($n = 460, 80.7\%$) had been read to by at least one family member in the last week and of these, 26 (5.7%) were read a story in an Indigenous language. Across both waves, the children were read books by their mothers, fathers, siblings, grandparents, aunts, uncles, cousins, friends, teachers/carers, and others (see Table 2). The continuation of reading to children across the early years was considered in a longitudinal analysis for the 533 children who were present both in waves 1 and 3. There was a significant relationship between the two waves ($\chi^2(1) = 35.8, p = .00$), with 86.5% of children who were read to at wave 1 also being read to at wave 3. Overall, it appears that there was rich engagement with literacy between the children and members of their families and communities.

In wave 3, since the children were 5- to 7-years-old, additional questions were asked about the children's reading. The majority of study children had someone listen to them read during the past month ($n = 476, 83.5\%$) and of these, 21 (4.4%) read a story in an Indigenous language. The people who listened to the children read are listed in Table 2. Most of the study children in wave 3 were reported to be interested in reading ($n = 477, 83.7\%$). When they were 5- to 7-years-old, many were reported to be able to read simple words ($n = 423, 74.2\%$), some were reported to be able to read complex words ($n = 192, 33.7\%$), and simple sentences ($n = 272,$

47.7%) (the language was not specified). In addition, most of the study children were interested in copying letters and words ($n = 494$, 86.7%) and were able to write their own name ($n = 489$, 85.8%) according to parent report. Many of the children could also write simple words ($n = 396$, 69.5%) and simple sentences ($n = 219$, 38.4%). The children's mathematics and numeracy skills were also described. Most of the study children were reported by P1 to be able to sort things by shape and color ($n = 468$, 82.1%), count the number of things ($n = 480$, 84.2%), count to 20 ($n = 443$, 77.7%), recognize numbers ($n = 442$, 77.5%), and add ($n = 350$, 61.4%). The language(s) used by the children for writing and mathematics were not recorded. Similar to the finding above, overall, it appears that there was support for these young Indigenous children to engage with reading, writing, and numeracy.

Additional activities including those undertaken in Indigenous languages. The children undertook a wide range of indoor and outdoor activities with P1 and other family members during the week prior to data collection. These activities were undertaken in an Indigenous language by some of the children. Specifically, the majority of children played indoors with toys or games in the past week ($n = 646$, 93.4%) and of these, 38 (5.9%) children undertook this activity in an Indigenous language. Many children ($n = 630$, 91.0%) played music, sang songs, danced, or undertook other musical activities and of these, 49 (7.8%) undertook this activity in an Indigenous language. Many children drew pictures, art, or craft activities with family members ($n = 567$, 81.9%) and of these, 31 (5.5%) undertook this activity in an Indigenous language. Just under half of the children played computer, Xbox, or PlayStation games ($n = 334$, 48.3%) and of these, 14 (4.2%) undertook this activity in an Indigenous language. Many children played outdoors ($n = 657$, 94.9%) and of these, 41 (6.2%) undertook this activity in an Indigenous language. Three quarters of the children went to a playground ($n =$

518, 74.9%) and 27 (5.2%) used an Indigenous language. Many children ($n = 619$, 89.5%) went shopping in the past week and of these, 33 (5.3%) used an Indigenous language while shopping. Many children ($n = 543$, 78.5%) were involved in housework or cooking, and of these, 27 (5.0%) used an Indigenous language. Half of the children went swimming in the past week ($n = 348$, 50.3%) and of these, 35 (10.1%) used an Indigenous language during this activity.

Parents' wishes regarding passing on language and culture. In wave 3, P1 was asked which aspects of Aboriginal and Torres Strait Island culture they would like to pass onto the study child at this age and could select up to five options from a list. Almost one third of the sample wanted to pass on "speaking language" ($n = 174$, 30.5%) and "story-telling and yarning" ($n = 171$, 30.0%). Other aspects of culture they would like to pass on were: family history ($n = 345$, 60.5%), showing respect ($n = 332$, 58.2%), pride in identity ($n = 315$, 55.3%), knowing country ($n = 286$, 50.2%), bush tucker (sourcing food from the Australian landscape), hunting, and fishing ($n = 225$, 39.5%), singing, music, and dance ($n = 202$, 37.2%), traditions and ceremony ($n = 202$, 35.4%), family networks ($n = 187$, 32.8%), spiritual beliefs ($n = 116$, 20.4%), painting or weaving ($n = 90$, 15.8%), and other aspects ($n = 11$, 1.9%).

Parents' wishes regarding language learning at school. In wave 3, because the children were at school, a question was asked about whether P1 would like their study child to learn an Indigenous language at school. Many ($n = 263$, 46.1%) indicated that they would like an Indigenous language to be available as a second language at school. Almost a third ($n = 174$, 30.5%) indicated that they would like their child to learn an Indigenous language in a bilingual program learning both English and an Indigenous language. A few ($n = 8$, 1.4%) wanted an Indigenous language to be used as the main language at school, with English taught as a second language. Others ($n = 65$, 11.4%) indicated that they would like for the study child to learn an

Indigenous language as a compulsory second language, and some ($n = 51$, 8.9%) did not want their child to learn an Indigenous language at school.

Concerns about Hearing, Speech, and Language Skills

The children's hearing history and status was explored in waves 1 and 3 (see Table 3). In wave 1, 143 (20.7%) of children were reported to have "runny ears" (otitis media) and a further 9 (1.3%) had a perforated ear drum. By wave 3, fewer children ($n = 65$, 11.4%) were reported to have runny ears (otitis media) and 6 (1.1%) had had a perforated ear drum. Few were reported to have hearing loss (see Table 3). The incidence of otitis media was found to significantly decrease among children who were present during both waves 1 and 3 ($\chi^2(1) = 15.1$, $p = .34$), with 78.9% of children who were reported to have "runny ears" at wave 1 no longer reported to have this problem by wave 3.

In both waves 1 and 3, the P1s were asked whether they had concerns about the study children's expressive and receptive speech and language skills (see Table 4). In wave 1, 24.3% had some level of concern about how their child "talked and made speech sounds" (yes: $n = 96$, 13.9%, a little: $n = 72$, 10.4%). Specifically, they were concerned that their child's speech was "not clear to others" ($n = 90$, 13.0%), and "not clear to the family" ($n = 59$, 8.5%). They were also concerned that some children had "difficulty putting words together" ($n = 42$, 6.1%), "stutters, stammers or lisps" ($n = 34$, 4.9%) or had "other speech difficulties" ($n = 28$, 4.0%) (see Table 4). By wave 3, fewer parents had concerns about how their child "talked and made speech sounds" (yes: $n = 51$, 8.9%, a little: $n = 55$, 9.6%) and the major specific areas of concern remained the same.

P1s also were asked to report on concerns regarding their children's receptive language skills. In wave 1, 10.0% had some level of concern about how their child's ability to "understand

what you say” (yes: $n = 24$, 3.5%, a little: $n = 45$, 6.5%). Specifically, they were concerned that their child was unable to “understand what you say” ($n = 28$, 4.0%), and “understand what others say” ($n = 24$, 3.5%) (see Table 4). By wave 3, fewer parents reported concerns about their child’s ability to “understand what you say” (yes: $n = 19$, 3.3%, a little: $n = 24$, 4.4%) and the major specific areas of concern remained the same. A significant relationship was found between P1s who expressed concern about their children’s understanding at wave 1, and those who continued to hold these concerns at wave 3 ($\chi^2(1) = 53.6$, $p = .00$) indicating that there were some children who continued to have receptive language difficulties at ages 5 to 7 years.

In wave 3, if the P1s had identified that they had concerns, they were asked whether the study children were receiving intervention for difficulties with speech and comprehension. In response to the question “Is (study child) receiving any treatment for (his/her) speech difficulties?” the P1s responded: yes ($n = 63$, 59.4%), no ($n = 41$, 38.7%), don’t know ($n = 2$, 1.9%). Similarly, in response to the question “Is (study child) receiving any treatment for (his/her) understanding difficulties?” the P1s responded: yes ($n = 26$, 59.1%), no ($n = 17$, 38.6%), don’t know ($n = 1$, 2.3%).

Discussion

Languages Spoken by Indigenous Australian Children

Indigenous Australian children are able to speak many languages, including English, Indigenous languages, creoles, foreign languages, and sign languages. Most of the children aged between 3 and 7 years within the Child cohort of LSIC spoke English (including Aboriginal English; wave 1: 91.2%, wave 3: 99.6%), which was anticipated, since by wave 3, the children attended school where English is the medium of instruction. Many of the children also spoke Indigenous languages (wave 1: 24.4%, wave 3: 26.8%) and creoles (wave 1: 11.5%, wave 3:

13.7%). In the current study, the greater the children's geographic isolation, the more likely they were to speak creoles or Indigenous languages. Indigenous languages spoken as children's main language were: Anindilyakwa, Arrernte, Djambarrpuynu, Galpu, Gurindji, Kalaw Kawaw Ya/Kalaw Lagaw Ya, Luritja, Meriam Mir, Murrinh Patha, and Warlpiri. Additional Indigenous languages were spoken "alright" or as "some words only."

The language use of the children in the current LSIC sample was compared with nationally representative data of 4,983 4- to 5-year-old Australian children from the K cohort of LSAC. More children in wave 1 of the Child cohort of LSIC aged 3- to 5-years spoke languages other than English (27.0%) than children in wave 1 of the K cohort of LSAC aged 4- to 5-years (12.2%) (McLeod, 2011). The main languages spoken by children in LSAC were Arabic, Cantonese, Vietnamese, Greek, and Mandarin (McLeod, 2011). As outlined above, the main other languages spoken by the children in LSIC were Indigenous languages; few children in the LSIC sample spoke foreign or sign languages (wave 1: 2.5%, wave 3: 5.4%); however, these were not specified further.

Language Learning Environments of Indigenous Australian Children

Parental desires and language ideologies play an important role in shaping the choices made by families about which languages a child will acquire and the amount of exposure children will have to each of their languages (King, Fogle, & Logan-Terry, 2008). Indigenous families and communities within the LSIC study provided rich language-learning opportunities in English as well as in other languages. Storytelling and book reading was a strong feature of the environments of most of the study children aged 3 to 7 years. More than seventy percent of the children in both waves had been told an oral story in the past week (wave 1: 72.0%, wave 3: 70.4%), and even more had been read a story from a book in the past week (wave 1: 79.0%,

wave 3: 80.2%). In the past month, 83.5% of children in wave 3 had read to others. These figures are higher than are typically reported for Indigenous families in other parts of the world (e.g., Loeb & Redbird, 2008). Within the current study, there was a strong family and community focus on storytelling and book reading. In both waves of data collection, these activities were supported by family members, friends, and others (see Table 2). In addition, there were many other opportunities provided by families and communities for interaction, play, and learning including: music, art and craft, playing on computers, visiting playgrounds, going swimming, shopping, and cooking; situations that are that are typical for most Australian children. Some children ($\leq 10\%$) undertook these activities in Indigenous languages. There were more children who used an Indigenous language during oral story telling or swimming than any for other activity. The finding that swimming was an activity where Indigenous languages were spoken was not surprising since swimming is a highly social activity in Australia with families spending hours together at the swimming pool, river, or lake.

The lower numbers of children being read to and reading books in Indigenous languages may be related to the lack of available published children's literature in local Indigenous languages. In the US, Northwest Native American Reading Curriculum is supported by Elders and respected members of the community to read stories that are written and illustrated by members of the community and incorporate relevant cultural knowledge and values (Costantino & Hurtado, 2005). Almost a third of families in the current study wanted to pass on their cultural language, and many indicated that they would like their child to learn an Indigenous language at school. Language policy in Australia has made steps toward meeting the desires of families to support Indigenous languages in educational settings. The recently developed Australian policy, Indigenous Languages – A National Approach (Department of Environment, Water, Heritage,

and the Arts, 2009), recognizes the importance of Indigenous language bilingual programs in schools. The aim of this policy is to support literacy and language development both in home languages and English, to transmit Indigenous language and culture, and support long-term academic achievement and success of Indigenous children (Australian Curriculum, Assessment, and Reporting Authority, 2011). The maintenance of home languages (whether oral or literate) is associated with personal and national identity and enables children to attain communicative skills, cognitive advantages, and intercultural benefits (Kirsch, 2012).

Parental Concern about Hearing, Speech, and Language Skills

Parental concern about their children's speech and language skills were compared for children within wave 1 of the Child cohorts of LSIC ($n = 692$) and LSAC ($n = 4,983$), the nationally representative study. Parents in both studies had a similar level of concern about speech and language skills (LSIC=24.3% versus LSAC=25.2%) (McLeod & Harrison, 2009). A similar number of LSIC parents of 3- to 5-year-olds (wave 1) had concern about speech and language skills to the LSAC parents of 4- to 5-year-olds (LSIC: 24.3% versus LSAC: 25.2%) (McLeod & Harrison, 2009). Similarly, "speech not clear to others" was the area of highest concern for the 4- to 5-year-old children in LSAC (LSIC: 13% versus LSAC: 12.0%) (see Table 4). The questions and timing of questions within the LSIC and LSAC samples regarding service access were worded differently, so comparisons are not easily made. However, when children in the LSIC sample were in wave 3 (5 to 7 years), parents reported that 63 (11.1% of all children) had received intervention for speech difficulties and 26 (4.6% of all children) had received intervention for difficulties understanding others. When children within the LSAC sample were in wave 1 (4 to 5 years), parents and teachers reported 14.5% of all children had accessed speech-language pathology services and an additional 2.2% needed but could not access services

(McLeod & Harrison, 2009). The similarity between the LSAC and LSIC studies regarding the levels of concern (Table 4) was surprising, particularly considering the reported disparity between health and access for Indigenous Australians (Booth & Carroll, 2005). Rates of middle ear disease in Indigenous children have been found to decrease with age (cf. Williams et al., 2009). The current study supported this finding with the incidence of otitis media significantly decreasing among children, with 78.9% of children no longer reported to have this problem by wave 3. For all children, whether Indigenous or non Indigenous, there was a greater level of concern compared with accessing services, a complex problem associated with availability and perception of need for services (McAllister, McCormack, McLeod, & Harrison, 2011; Ruggero, McCabe, Ballard, & Munro, 2012). The current data do not allow consideration of whether even greater disparity in accessing services exists for Indigenous children. Throughout the world, there are many cautions about the need for culturally appropriate and safe practices for supporting Indigenous children's language and literacy acquisition (Ball & Lewis, 2011; Williams, 2012). For example, Loeb and Redbird (2008, p. 5) recommend "...a more culturally sensitive implementation of services" by emphasizing cooperative, multisensory, and holistic learning. The current data indicate that while many children are maintaining their Indigenous language and have family and community support for language learning activities (e.g., telling stories, reading books) there are some children who do not. For example, 17% had ceased using their Indigenous language by wave 3 and 25.1% were not longer told oral stories by wave 3. Consequently, there is a need for children across Australia to be able to access appropriate health and educational services that acknowledge and support their language strengths and diversity and also support family and community language initiatives.

Limitations and Directions for Further Research

This paper presents findings from a large sample of Indigenous Australian children; however, as acknowledged in the method, the sample was not a nationally representative sample, instead it was gained through purposive sampling across 11 sites. While 77.0% of children from the wave 1 sample was present in wave 3, the adaptive sampling techniques used by the research administration officers meant that children were added to wave 3. Within this paper, when reporting cross-sectional data, the entire cohort of children within the specified age ranges was used. When reporting longitudinal comparison data, only children who were present in both waves 1 and 3 were compared (representing 77% of the entire sample).

As with many epidemiological studies, the data presented in the current paper primarily are based on parent report. Parent report provides important insights into children's lives; however, it may be possible that some parental responses may be influenced by the social desirability of reporting positive outcomes. Additionally, there was attrition between wave 1 and 3. While there was no significant difference between those present only in wave 1 versus those present in waves 1 and 3 for the variables of gender, socio-economic status (SEIFA Advantage/Disadvantage) or parental concerns about speech on the PEDS, there was a significant difference between the number of languages spoken. Children present in wave 1 but not wave 3 used significantly more languages than children who were present at both waves 1 and 3 and this may have influenced the results. In order to supplement the information about the children, the LSIC researchers also have asked children's teachers about the study children, so further analysis of teacher report would be valuable in the future.

Direct assessment of Indigenous children's language use is difficult due to the absence of relevant measures and approaches (Gould, 2008; Pearce & Williams, 2013). In the current paper, one direct measure of children's language skill was reported. The Renfrew Word Finding

Vocabulary Test (Renfrew, 1995) was used to describe children's expressive vocabulary. It is acknowledged that an expressive vocabulary test is not sufficient to describe children's overall language ability. There were additional limitations of using this assessment tool since it was developed in the UK, and normative data cannot be applied. Consequently, a non-standardized approach was taken to administration; for example, the research administration officers allowed children to name items in English or another language. Using assessments on an unintended population may result in lower scores, and in the case of the Renfrew Word Finding Vocabulary Test it may have been the case that vocabulary items tested may not have been within the life experiences of children in more remote areas in the study. While these data show that children's receptive vocabulary increased between waves 1 and 3, they were not able to be compared to data from other Australian children.

The current paper provides an important beginning step for understanding the speech and language of Indigenous Australian children by considering the speech and language competency of children in the Child cohort of LSIC. Future papers could compare these data with the younger children in the Babies cohort. Across both cohorts, children's addition, maintenance, and loss of languages could be examined in greater depth to provide insights into the longevity of Australia's rich heritage of Indigenous languages.

Conclusion

The current study demonstrates that Indigenous Australian children frequently speak more than one, and up to eight different languages. While the most common language spoken is English, approximately a quarter of children speak Indigenous languages and more than ten per cent speak creoles. Most Indigenous Australian children are supported by their families and communities to have rich language and literacy environments. Children in remote regions are

more likely to speak and experience Indigenous languages and cultures; whereas, children in urban environments may require additional resources to support Indigenous language learning. It is important that those within children's communities (including teachers) are equipped with knowledge and resources to support the development of Indigenous children's language competence and that collaborative partnerships are sustained to enable families to play an active role in their aspiration to pass on Indigenous language and culture to their children. Celebrating Indigenous Australian children's speech and language competence and the resources of their families and communities is one step toward the recommendation within Article 13 of the United Nations Convention on the Rights of Indigenous Peoples "...to revitalize, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literatures..." (United Nations, 2008, p. 7).

Acknowledgments

The authors acknowledge the contribution of the members Longitudinal Study of Indigenous Children (LSIC); specifically: the children and their families and the current and previous members of the LSIC steering committee, data team, and interviewers. The authors also thank Karen Martin, Adam Winsler, Fiona Skelton, and Deborah Kikkawa who provided advice on aspects of the manuscript. Sharynne McLeod acknowledges support from the Australian Research Council Future Fellowship (FT0990588) and Sarah Verdon acknowledges support from a scholarship from the Department of Industry (previously the Department of Industry, Innovation, Science, Research and Tertiary Education), and an Excellence in Research in Early Years Education Collaborative Research Network scholarship from Charles Sturt University. The Early Years Education Collaborative Research Network is an interdisciplinary group of researchers from Charles Sturt University, Queensland University of Technology, and Monash University who respect and acknowledge the importance of children and families in Australian Aboriginal cultures and acknowledge the many places of learning that have always been important to the traditional custodians of the lands on which we meet and work. The authors and the Department of Social Services acknowledge the traditional owners of country throughout Australia, and their continuing connection to land, sea and community. We pay our respect to the traditional owners of country and their cultures, and to elders both past and present.

References

- Australian Bureau of Statistics (ABS). (2006). *Population characteristics, Aboriginal and Torres Strait Islander Australians, 2006*. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/2B3D3A062FF56BC1CA256DCE007FBFFA?OpenDocument>
- Australian Bureau of Statistics (ABS). (2008). *2033.0.55.001 - Census of population and housing: Socio-Economic Indexes for Areas (SEIFA), Australia - Data only, 2006*. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2033.0.55.001Main+Features12006?OpenDocument>
- Australian Bureau of Statistics (ABS). (2012). *Culture, heritage and leisure: Connections with cultural groups and the land*. Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4725.0Chapter210Apr%202011>
- Australian Council for Educational Research (ACER). (2009). *Footprints in time, wave 2: Report on Who am I? and the Renfrew Word Finding Vocabulary Test*. Retrieved from http://www.fahcsia.gov.au/sites/default/files/files/about-fahcsia/publication-articles/footprints/who_am_I.pdf
- Australian Curriculum, Assessment, and Reporting Authority. (2011). *The shape of the Australian curriculum: Languages*. Sydney, Australia: Author.
- Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS), & the Federation of Aboriginal and Torres Strait Islander Languages. (2005). *National Indigenous languages survey (NILS) report*. Canberra, Australia: Commonwealth of Australia.

Australian Population and Migration Research Centre (APMRC). (2013). *ARIA*

(*Accessibility/Remoteness Index of Australia*). Adelaide, Australia: The University of

Adelaide. Retrieved from

http://www.adelaide.edu.au/apmrc/research/projects/category/about_aria.html

Australian Research Alliance for Children and Youth (ARACY). (2013). *Report card: The*

wellbeing of young Australians. Retrieved from

<http://www.aracy.org.au/documents/item/126>

Ball, J., & Lewis, M. (2011). "An altogether different approach": Roles of speech-language pathologists in supporting Indigenous children's language development. *Canadian Journal of Speech-Language Pathology and Audiology*, 35, 144-158.

Bauert, P. A., Brown, N. J., Collins, B., & Martin, C. M. (2001). Indigenous Australian children: Educating for health. *The Medical Journal of Australia*, 174, 488-489.

Booth, A., & Carroll, N. (2005). *The health status of Indigenous and non-Indigenous Australians* (Discussion Paper No. 486). Canberra, Australia: The Australian National University Centre for Economic Policy Research.

Boswell, J. (1997). Presentation of early otitis media in 'Top End' Aboriginal infants. *Australian and New Zealand Journal of Public Health*, 21(1), 100-102. doi:10.1111/j.1467-842X.1997.tb01663.x

Bus, A. G., Van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, 65(1), 1-21. doi: 10.3102/00346543065001001

Butcher, A. (2008). Linguistic aspects of Australian Aboriginal English. *Clinical Linguistics and Phonetics*, 22(8), 625-642. doi:10.1080/02699200802223535

Centre for Community Child Health and Telethon Institute for Child Health Research. (2009). *A snapshot of early childhood development in Australia - AEDI National Report 2009*.

Canberra, Australia: Australian Government.

Coghlan, D., Kiing, J. S. H., & Wake, M. (2003). Parents' evaluation of developmental status in the Australian day-care setting: Developmental concerns of parents and carers. *Journal of Paediatrics and Child Health*, 39(1), 49-54. doi: 10.1046/j.1440-1754.2003.00084.x

Costantino, M., & Hurtado, D. S. (2005). The Northwest Native American reading curriculum. *NABE News*, 28(6), 19-25.

De Lemos, M., & Doig, B. (1999). *Who Am I? Developmental assessment manual*. Melbourne, Australia: Australian Council for Educational Research.

Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA).

(2009). *Footprints in time: The longitudinal study of Indigenous children: Key summary report from wave 1*. Canberra, Australia: Author.

Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA).

(2012a). *Footprints in time: The longitudinal study of Indigenous children: Key summary report from wave 3*. Canberra, Australia: Author.

Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA).

(2012b). *Footprints in time, the longitudinal study of Indigenous children data user guide 3.0*. Canberra, Australia: Author. Retrieved from <http://www.dss.gov.au/about-fahcsia/publications-articles/research-publications/longitudinal-data-initiatives/footprints-in-time-the-longitudinal-study-of-indigenous-children-lsic>

- Department of the Environment, Water, Heritage and the Arts. (2009). *Indigenous languages — A national approach: The importance of Australia's Indigenous languages*. Retrieved from www.arts.gov.au/indigenous/languages_policy.
- Dixon, L. Q., Wu, S., & Daraghme, A. (2012). Profiles in bilingualism: Factors influencing kindergarteners' language proficiency. *Early Childhood Education Journal*, 40(1), 25-34. doi: 10.1007/s10643-011-0491-8
- Dodd, B., Hua, Z., Crosbie, S., Holm, A., & Ozanne, A. (2002). *Diagnostic Evaluation of Articulation and Phonology (DEAP)*. London, UK: Psychological Corporation.
- Duursma, E. V., Augustyn, M., & Zuckerman, B. (2008). Reading aloud to children: The evidence. *Archives of Disease in Childhood*, 93(7), 554-557.
- Eagleson, R. D. (1982). Aboriginal English in an urban setting. In R. D. Eagleson, S. Kaldor, & I. Malcolm (Eds.), *English and the Aboriginal child* (pp. 113-162). Canberra, Australia: Curriculum Development Centre.
- Ehri, L.C., & Roberts, T. (2006). The roots of learning to read and write: Acquisition of letters and phonemic awareness. In S. Neuman & D. Dickinson (Eds.), *Handbook of early literacy research* (Vol. 2, pp. 113-131). New York: Guilford.
- Gibson, P. G., Stuart, J. E., Wlodarczyk, J., Olson, L. G., & Hensley, M. J. (1996). Nasal inflammation and chronic ear disease in Australian Aboriginal children. *Journal of Paediatrics and Child Health*, 32(2), 143-147. doi: 10.1111/j.1440-1754.1996.tb00911.x
- Glascoc, F. P. (1994). It's not what it seems. The relationship between parents' concerns and children with global delays. *Clinical Pediatrics*, 33(5), 292-296. doi: 10.1177/000992289403300507

Glascoe, F. P. (1996). The importance of discussing parents' concerns about development.

Ambulatory Child Health, 2, 349–356.

Glascoe, F. P. (2000). *Parents Evaluation of Developmental Status: Authorized Australian*

version. Parkville, Australia: Center for Community Child Health.

Gould, J. (2008). Non-standard assessment practices in the evaluation of communication in

Australian Aboriginal children. *Clinical Linguistics and Phonetics*, 22(8), 643-657. doi:

10.1080/02699200802222206

Grech, H., & McLeod, S. (2012). Multilingual speech and language development and disorders.

In D. Battle (Ed.), *Communication disorders in multicultural and international populations* (4th ed., pp. 120-147). St Louis, MO: Elsevier.

IBM Corporation (2011). *IBM SPSS Statistics for Windows, Version 20.0* [computer program].

Armonk, NY: Author.

Kaldor, S., & Malcolm, I. G. (1979). The language of the school and the language of the Western

Australian Aboriginal school child: Implications for education. In R. M. Berndt & C. H.

Berndt (Eds.), *Aborigines of the West: Their past and their present* (pp.406-437).

Nedlands, Australia: University of Western Australia Press.

Kaldor, S., & Malcolm, I. G. (1982). Aboriginal English in country and remote areas: A Western

Australian perspective. In R. D. Eagleson, S. Kaldor, & I. G. Malcolm (Eds.), *English and*

the Aboriginal child (pp. 75-112). Canberra, Australia: Curriculum Development Centre.

Kaldor, S., & Malcolm, I. G. (1991). Aboriginal English: An overview. In S. Romaine (Ed.),

Language in Australia (pp. 67-83). Cambridge, UK: Cambridge University Press.

King, K. A., Fogle, L., & Logan-Terry, A. (2008). Family language policy. *Language and*

Linguistics Compass, 2(5), 907-922. doi: 10.1111/j.1749-818X.2008.00076.x

- Kirsch, C. (2012). Ideologies, struggles and contradictions: An account of mothers raising their children bilingually in Luxembourgish and English in Great Britain. *International Journal of Bilingual Education and Bilingualism*, 15(1), 95-112. doi: 10.1080/13670050.2011.607229
- Lee, J., Grigg, W., & Donhaue, P. (2007). *The nation's report card: Reading 2007* (NCES 2007-496). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://nces.ed.gov/nationsreportcard/pubs/main2007/2007496.asp>
- Loeb, D. F., & Redbird, K. (2008). Fostering the literacy of Indigenous elementary school-age children. *Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse Populations*, 15(1), 5-11. doi: 10.1044/cds15.1.5
- McAllister, L., McCormack, J., McLeod, S., & Harrison, L. J. (2011). Expectations and experiences of accessing and participating in services for childhood speech impairment. *International Journal of Speech-Language Pathology*, 13(3), 251-267. doi: 10.3109/17549507.2011.535565
- McConvell, P. (2008). Language mixing and language shift in Indigenous Australia. In J. Simpson & G. Wigglesworth (Eds.), *Children's language and multilingualism: Indigenous language use at home and school* (pp. 237-260). London, UK: Continuum.
- McLeod, S. (2011). Cultural and linguistic diversity in Australian 4- to 5-year-old children and their parents. *ACQuiring Knowledge in Speech, Language, and Hearing*, 13(3), 112-119.
- McLeod, S. (2013). Speech sound acquisition. In J. E. Bernthal, N. W. Bankson, & P. Flipsen Jr (Eds.), *Articulation and phonological disorders: Speech sound disorders in children* (7th ed., pp. 58-113). Boston, MA: Pearson Education.

- McLeod, S., & Harrison, L. J. (2009). Epidemiology of speech and language impairment in a nationally representative sample of 4- to 5-year-old children. *Journal of Speech, Language, and Hearing Research, 52*(5), 1213-1229. doi:10.1044/1092-4388(2009/08-0085)
- McLeod, S., Harrison, L. J., McAllister, L., & McCormack, J. (2013). Speech sound disorders in a community study of preschool children. *American Journal of Speech-Language Pathology, 22*, 503-522. doi: 10.1044/1058-0360(2012/11-0123).
- Obata, K., & Lee, J. (2010). Languages of Aboriginal and Torres Strait Islander peoples: A uniquely Australian heritage. In Australian Bureau of Statistics (Eds.), *1301.0 - Year Book Australia, 2009-10*. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/1301.0Feature+Article42009-10>
- Oller Jr., J. W., Oller, S. D., & Badon, L. C. (2006). *Milestones: Normal speech and language development across the lifespan*. San Diego, CA: Plural Publishing.
- O'Shannessy, C. (2005). Light Warlpiri: A new language. *Australian Journal of Linguistics, 25*(1), 31-57. doi: 10.1080/07268600500110472
- Paradis, J., Genesee, F., & Crago, M. (Eds.). (2011). *Dual language development and disorders: A handbook on bilingualism and second language learning* (2nd ed.). Baltimore, MD: Paul H. Brookes.
- Park, S. M., & Sarkar, M. (2007). Parents' attitudes toward heritage language maintenance for their children and their efforts to help their children maintain the heritage language: A case study of Korean-Canadian immigrants. *Language, Culture and Curriculum, 20*(3), 223-235. doi: 10.2167/lcc337.0
- Patterson, J., & Pearson, B. Z. (2004). Bilingual lexical development: Influences, contexts, and processes. In B. Goldstein (Ed.), *Bilingual language development and disorders in*

Spanish-English speakers (pp. 77–104). Baltimore, MD: Paul H. Brookes.

Pearce, W. M., & Williams, C. (2013). The cultural appropriateness and diagnostic usefulness of standardized language assessments for Indigenous Australian children. *International Journal of Speech-Language Pathology*, *15*(4), 429-440.

doi:10.3109/17549507.2012.762043

Power, D., & Hyde, M. (2002). The characteristics and extent of participation of deaf and hard-of-hearing students in regular classes in Australian schools. *Journal of Deaf Studies and Deaf Education*, *7*(4), 302-311. doi:10.1093/deafed/7.4.302

Renfrew, C. (1995). *The Renfrew Language Scales: Word Finding Vocabulary Test* (4th ed.). Milton Keynes, UK: Speechmark.

Ruggero, L., McCabe, P., Ballard, K. J., & Munro, N. (2012). Paediatric speech-language pathology service delivery: An exploratory survey of Australian parents. *International Journal of Speech-Language Pathology*, *14*(4), 338-350.

doi:10.3109/17549507.2011.650213

Saravanan, V. (2001). The significance of bilingual Chinese, Malay and Tamil children's English network patterns on community language use patterns. *Early Child Development and Care*, *166*, 81–91. doi: 10.1080/0300443011660107

Sharpe, M. C. (1977). Alice Springs Aboriginal English. In E. Brumby & E. Vaszolyi (Eds.), *Language problems and Aboriginal education*. Perth, Australia: Mt. Lawley College of Advanced Education.

Shriberg, L. D., Flipsen, P., Jr., Thielke, H., Kwiatkowski, J., Kertoy, M. K., Katcher, M. L., . . . Block, M. G. (2000). Risk for speech disorder associated with early recurrent otitis media

- with effusion: Two retrospective studies. *Journal of Speech, Language, and Hearing Research*, 43, 79-99. doi: 1092-4388/00/4301-0079
- Shriberg, L. D., Friel-Patti, S., Flipsen, P. J., & Brown, R. L. (2000). Otitis media, fluctuant hearing loss, and speech-language outcomes: A preliminary structural equation model. *Journal Speech, Language and Hearing Research*, 43, 100-120. doi: 1092-4388/00/4301-0100
- Soloff, C., Lawrence, D., Misson, S., & Johnstone, R. (2006). *LSAC Technical paper no. 3 wave 1 weighting and non-response*. Canberra, Australia: Australian Institute of Family Studies.
- Taylor, J., & Bell, M. (2004). Continuity and change in Indigenous Australian population mobility. In J. Taylor, & M. Bell (Eds.), *Population mobility and Indigenous peoples in Australasia and North America*. (pp. 1-10). New York, NY: Routledge.
- Toohill, B. J., McLeod, S., & McCormack, J. (2012). Effect of dialect on identification and severity of speech impairment in Indigenous Australian children. *Clinical Linguistics and Phonetics*, 26(2), 101-119. doi:10.3109/02699206.2011.595523
- United Nations. (2008). *United Nations Declaration on the Rights of Indigenous Peoples*. Geneva, Switzerland: Author. Retrieved from http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf
- Verdon, S., McLeod, S., & Winsler, A. (2013). *Language maintenance and loss in a population study of young Australian children*. Manuscript submitted for publication.
- Victorian Aboriginal Corporation for Languages (VACL). (2010). *About us*. Retrieved from <http://www.vaclang.org.au/>
- Vivas, E. (1996). Effects of story reading on language. *Language Learning*, 46(2), 189-216. doi: 10.1111/j.1467-1770.1996.tb01234.x

- Weigel, D. J., Martin, S. S., & Bennett, K. K. (2006). Contribution of the home literacy environment to preschool-aged children's emerging literacy and language skills. *Early Child Development and Care, 176*(3-4), 357-378. doi: 10.1080/03004430500063747
- Westby, C., & Inglebret, E. (2012). Native American and worldwide indigenous cultures. In D. Battle (Ed.), *Communication disorders in multicultural and international populations* (4th ed., pp. 76-101). St Louis, MO: Elsevier.
- Williams, C. (2000). Multiculturalism: Language in Aboriginal Australia: Aboriginal English. *ACQuiring Knowledge in Speech, Language and Hearing, 2*(2), 70-72.
- Williams, C. J. (2012). Sociolinguistic and cultural considerations when working with Indigenous children in Australia. In S. McLeod & B. A. Goldstein (Eds.), *Multilingual aspects of speech sound disorders in children* (pp. 28-31). Bristol, UK: Multilingual Matters.
- Williams, C. J., Coates, H. L., Pascoe, E. M., Axford, Y., & Nannup, I. (2009). Middle ear disease in Aboriginal children in Perth: Analysis of hearing screening data, 1998 - 2004. *Medical Journal of Australia, 190*(10), 598-600.
- Williams, C., & Jacobs, A. (2009). The impact of otitis media on cognitive and educational outcomes. *Medical Journal of Australia, 191*(9), S69- S72.
- Williams, C. J., & Masterson, J. J. (2010). Phonemic awareness and early spelling skills in urban Australian Aboriginal and non-Aboriginal children. *International Journal of Speech-Language Pathology, 12*(6), 497-507. doi:10.3109/17549507.2011.481798
- Wong Fillmore, L. (1991). When learning a second language means losing the first. *Early Childhood Research Quarterly, 6*(3), 323-346. doi: 10.1016/S0885-2006(05)80059-6

- Zubrick, S. R., Lawrence, D. M., Silburn, S. R., Blair, E., Milroy, H., Wilkes, T., ... Doyle, S., (2004). *The Western Australian Aboriginal Child Health Study: The health of Aboriginal children and young people*. Perth, Australia: Telethon Institute for Child Health Research.
- Zumach, A., Gerrits, E., Chenault, M., & Anteunis, L. (2010). Long-term effects of early-life otitis media on language development. *Journal of Speech, Language, and Hearing Research, 53*(1), 34-43. doi:10.1044/1092-4388(2009/08-0250)

Table 1.

The Languages Spoken by the Study Children at 3 to 5 Years (wave 1: n = 692) and 5 to 7 Years (wave 3: n = 569) Compared with the Level of Relative Isolation (LORI)

Language	None				Low				Moderate				High/ Extreme				Total			
	Wave 1		Wave 3		Wave 1		Wave 3		Wave 1		Wave 3		Wave 1		Wave 3		Wave 1		Wave 3	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
English/ Aboriginal English	166	100.0	145	100.0	356	98.9	290	99.7	62	62.0	65	100.0	47	71.2	68	100.0	631	91.2	568	99.8
An Indigenous language	11	6.6	4	2.8	37	10.3	35	12.0	43	43.0	35	53.9	19	28.8	22	32.4	110	15.9	96	16.9
A creole ^a	2	1.2	1	0.7	10	2.8	18	6.2	21	21.0	13	20.0	47	71.2	46	67.7	80	11.6	78	13.7
Foreign language	10	6.0	15	10.3	4	1.1	14	4.8	0	0.0	0	0.0	0	0.0	0	0.0	14	2.0	29	5.1
Sign language	3	1.8	1	0.7	1	0.3	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	4	0.6	2	0.4
Total number of cases	166		145		360		291		100		65		66		68		692		569 ^b	
TOTAL	192		166		408		358		126		113		113		136		839		773	

Note. ^a Creoles = Kriol/Torres Strait Creole/Gurindji Kriol. ^b Missing data for one participant. The percentage column represents the percent of cases since some cases spoke more than one language.

Table 2.

Number of People who Told an Oral Story, Read a Book, or Listened to the Study Child Read at 3 to 5 years (Wave 1: n = 692) and 5 to 7 Years (Wave 3: n = 570)

Person	Told an oral story to the study child (past week)				Read a book to the study child (past week)				Listened to study child read (past month) ^a	
	Wave 1		Wave 3		Wave 1		Wave 3		Wave 3	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Overall	498	72.0%	401	70.4%	547	79.0%	460	80.7%	476	83.5%
Mother/step mother	376	54.3%	257	45.1%	445	64.3%	341	59.8%	411	72.1%
Father/step father	164	23.7%	119	20.9%	147	21.2%	112	19.6%	155	27.2%
Sister	79	11.4%	41	7.2%	123	17.8%	71	12.5%	83	14.6%
Brother	66	9.5%	27	4.7%	74	10.7%	23	4.0%	46	8.1%
Grandmother	109	15.8%	66	11.6%	67	9.7%	45	7.9%	67	11.8%
Grandfather	40	5.4%	27	4.7%	20	2.9%	10	1.8%	18	3.2%
Aunt	52	7.5%	33	5.8%	53	7.7%	24	4.2%	36	6.3%
Uncle	19	2.7%	10	1.8%	7	1.0%	6	1.1%	12	2.1%
Cousin	41	5.9%	6	1.1%	39	5.6%	5	0.9%	15	2.6%
Friend	11	1.6%	4	0.7%	13	1.9%	3	0.5%	9	1.6%
Teacher/carer ^b	-	-	21	3.7%	-	-	41	7.2%	24	4.2%
Other	5	0.7%	3	0.5%	13	1.9%	3	0.5%	2	0.4%

Note. ^aThis question was only asked in wave 3. ^bThis option was only supplied in wave 3.
Table 3.

P1 Report of the Study Children’s Hearing History and Status at 3 to 5 Years (Wave 1: n = 692) and 5 to 7 Years (Wave 3: n = 570).

	Yes				No				Don’t know/ other			
	Wave 1		Wave 3		Wave 1		Wave 3		Wave 1		Wave 3	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Runny ears (otitis media)	143	20.7%	65	11.4%	541	78.2%	505	88.6%	8	1.1%	0	0.0%
Perforated ear drum	9	1.3%	6	1.1%	675	97.5%	564	98.9%	8	1.1%	0	0.0%
Total deafness	1	0.1%	0	0.0%	683	98.7%	570	100%	8	1.1%	0	0.0%
Deaf in one ear	1	0.1%	0	0.0%	683	98.7%	570	100%	8	1.1%	0	0.0%
Hearing loss/partially deaf	13	1.9%	8	1.4%	671	97.0%	562	98.6%	8	1.1%	0	0.0%
Other ear problem	16	2.3%	10	1.8%	668	96.5%	560	98.2%	8	1.1%	0	0.0%

Table 4.

PI’s Concerns about the Longitudinal Study of Indigenous Children’s (LSIC) Expressive and Receptive Speech and Language Skills at 3 to 5 Years (Wave 1: n = 692) Compared with Concerns Expressed by Parents of 4- to 5-Year-Old Children using Weighted Population Data from the Longitudinal Study of Australian Children (LSAC, Wave 1, N = 253,202) (McLeod & Harrison, 2009).

Domain	Concerns	Study	Yes		A little		No		Don’t know/ refused/ other / missing data	
			n	%	n	%	n	%	n	%
Expressive speech and language (Production)	Worries about study child’s speech	LSIC	96	13.9%	72	10.4%	502	72.5%	22	3.2%
		LSAC	29,829	11.8%	33,927	13.4%	189,269	74.8%	177	0.1%
	Speech not clear to family	LSIC	59	8.5%	-	-	619 ^a	89.5%	14	2.0%
		LSAC	15,078	6.0%	-	-	234,337	92.5%	3,787	1.5%
	Speech not clear to others	LSIC	90	13.0%	-	-	588 ^a	85.0%	14	2.0%
		LSAC	30,449	12.0%	-	-	218,966	86.5%	3,787	1.5%
	Stutters, stammers, or lisps	LSIC	34	4.9%	-	-	644 ^a	93.1%	14	2.0%
		LSAC	14,183	5.6%	-	-	235,233	92.9%	3,787	1.5%
	Voice sounds unusual	LSIC	11	1.6%	-	-	667 ^a	96.4%	14	2.0%
		LSAC	5,689	2.2%	-	-	243,727	96.3%	3,787	1.5%
	Reluctant to speak	LSIC	17	2.5%	-	-	661 ^a	95.5%	14	2.0%
		LSAC	5,468	2.2%	-	-	243,947	96.3%	3,787	1.5%
	Difficulty finding words	LSIC	25	3.6%	-	-	653 ^a	94.4%	14	2.0%
		LSAC	13,005	5.1%	-	-	236,411	93.4%	3,787	1.5%
	Difficulty putting words together	LSIC	42	6.1%	-	-	636 ^a	91.9%	14	2.0%
		LSAC	14,800	5.8%	-	-	234,615	92.7%	3,787	1.5%
Difficulty learning more	LSIC	5	0.7%	-	-	673 ^a	97.3%	14	2.0%	

	than one language ^c									
	Any other speech difficulties ^c	LSIC	28	4.0%	-	-	650 ^a	93.9%		
									14	2.0%
Receptive language (Understanding)	Worries about the study child understanding what you say	LSIC	24	3.5%	45	6.5%	618	89.3%	5	0.7%
		LSAC	11,159	4.4%	13,002	5.1%	228,891	90.4%	149	0.1%
	Understanding –what you say	LSIC	28	4.0%	-	-	648 ^b	93.6%	16	2.3%
		LSAC	6,836	2.7%	-	-	242,580	95.8%	3,787	1.5%
	Understanding – what others say	LSIC	24	3.5%	-	-	652 ^b	94.2%	16	2.3%
		LSAC	5,943	2.3%	-	-	243,473	96.2%	3,787	1.5%
	Understanding – hearing ^c	LSIC	10	1.4%	-	-	666 ^b	96.2%	16	2.3%
	Understanding – learning more than one language ^c	LSIC	0	0.0%	-	-	676 ^b	97.7%	16	2.3%
	Understanding – other ^c	LSIC	12	1.7%	-	-	664 ^b	96.0%	16	2.3%

Note. ^aThese numbers include those who answered “No” to the overarching question “Do you have worries about your study child’s speech?” (wave 1: *n* = 524) and “No” to the specific question. ^bThese numbers include those who answered “No” to the overarching question “Do you have worries about the study child understanding what you say?” (wave 1: *n* = 623) and “No” to the specific question. ^cThese questions were not asked in the LSAC study.