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Developing a parent vocabulary checklist for young Indigenous children growing up multilingual in the Katherine region of Australia's Northern Territory

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Abstract

Purpose: The aim of this study was to develop a checklist to assess vocabulary development in Indigenous Australian children, with a local focus on Indigenous Australian children growing up in the towns and communities of the Katherine Region in the Northern Territory of Australia. In this region, many families are multilingual and/or multidialectal and children's home languages include varieties of Aboriginal English, Kriol, traditional Aboriginal languages, and/or other languages.

Method: Over four years, a checklist was iteratively developed from parent interviews, comparisons of potential items to the content and structure of the Communicative Development Inventories (CDI): Words & Gestures (Short Form), team discussions and pilot testing with 33 parents of infants aged 0–4 years.

Result: The Early Language Inventory (ERLI) checklist offers new content compared with the CDI: Words & Gestures (short form) and the OZI (Australian English CDI, long form). Initial data from 33 parents suggests the checklist has desirable features: scores correlated positively with age and related to word combining, reaching ceiling around 3 years of age for many children. Infants whose parents had concerns tended to have lower scores.

Conclusion: ERLI is a new local adaptation of the CDI (Words & Gestures) for assessing early communication among Indigenous infants growing up in the Katherine region of the Northern Territory, Australia.

Keywords: *vocabulary; gesture; assessment; parents; Aboriginal; Indigenous*

Introduction

Culturally and linguistically valid assessment of speech, language and communication among Indigenous children in Australia is a key component to the goals of reducing Indigenous disadvantage in health, education and life outcomes, given the links between language development, literacy, well-being and life expectancy (Cahir, 2011). Yet culturally and linguistically valid assessment for Australian Indigenous children remains challenging for speech-language pathologists. Standardised language assessments that are in common use in Australia have been argued to be culturally inappropriate for Indigenous children, not helpful in distinguishing language difference from language disorder, and leading to over- and under-diagnosis (Cahir, 2011; Gould, 2008a, 2008b; Pearce & Williams, 2013; Pearce & Flanagan, 2019).

Linguistically, the home contexts of Indigenous children vary greatly across Australia, ranging from children growing up with a variety of Aboriginal English (a non-standard variety of English influenced by Indigenous language and communication patterns) through to other contexts, typically more remote, where children have as home language(s) a creole variety (e.g. Kriol, Yumplatok) and/or traditional language(s) in their linguistic repertoire. The key linguistic issue is that although Standard Australian English is the assumed language of standardised assessments (e.g. the Clinical Evaluation of Language Fundamentals, Fourth Edition, Australian Standardised Edition – Semel, Wiig, & Secord, 2006) it is rarely a home language for Indigenous children in Australia. Standard Australian English can be very different from the children's home language(s) at all

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levels (phonological, morphological, syntactic, semantic, pragmatic). At best, in urban school-aged testing contexts, where standardised assessments may seem least problematic, Indigenous children are effectively being assessed not on their actual full communicative abilities and repertoire, but just on their early abilities to code-switch into Standard Australian English as an additional dialect (a likelihood acknowledged by Miller, Webster, Knight, & Comino, 2014, for example).

Culturally, standardised assessments developed with different populations are seen as problematic (Gould, 2008a, 2008b) due to their decontextualised nature and unfamiliar interaction experience as compared with interaction styles that are more familiar (i.e., contextualised and more indirect). In recognition of these issues, it has been suggested that the use of other assessment practices is warranted (e.g. language samples analysis based on spoken narrative protocol, dynamic assessment, caregiver report, teacher report, and the use of novel stimuli such as in nonword repetition). These other assessment practices are suggested to be used instead of standardised assessments (Cahir, 2011; Gould, 2008a, 2008b; Pearce & Flanagan, 2019), or at least alongside them perhaps in some urban contexts or when mandated in the education system (Miller et al., 2014). The dangers of the linguistic and cultural assumptions built into standardised assessment tools are compounded by the fact that many speech-language pathologists in Australia speak only Standard Australian English rather than the target language of those being assessed (Li'el, Williams, & Kane, 2018) and are culturally from non-Indigenous backgrounds themselves.

A key imperative in linguistically and culturally appropriate assessment is the need to respect the diversity of Aboriginal and Torres Strait Islander languages and cultures within Australia. Local contexts can differ greatly, both between and within communities. A process of local adaptation to local language(s) and culture(s) is, however, the recommended approach for the vocabulary checklists known internationally as the MacArthur Bates Communicative Development Inventories (CDI Advisory Board, 2015b; Fenson et al., 2007). Worldwide, adaptations have been made for over 90 other languages (CDI Advisory Board, 2015a). With this in mind, an adaptation of a CDI for Indigenous families within a locally identifiable region of Australia seems worth exploring to honour local languages and cultures and provide a locally appropriate assessment tool. One such local region is the Katherine region of the Northern Territory (NT). The Katherine NT region is a geographically large area with considerable internal cultural and linguistic diversity yet also considerable intermarriage, mobility and social relations among Indigenous peoples living in remote communities, remote towns and the large regional centre of the town of Katherine.

An important characteristic of the early language environment of Indigenous children in the Katherine NT region is multilingualism. Most Indigenous children in the region grow up with several languages in their repertoire, a fact we wanted to celebrate and honour in the checklist we developed, rather than framing multilingualism as a problem or ignoring it. We designed the checklist from the outset to be a multilingual checklist where the child would receive credit for a checklist item, in whichever language(s) they say or understand the word. The checklist offers recognition options for each of the 120 semantic items in two languages in which many local families raise young children: Aboriginal ways of using English (Eades, 2013, 2014; also termed Aboriginal English) and various varieties of northern Australia Kriol, an English-based creole language of northern Australia which is now a first language for many young Indigenous adults and children (see Schultze-Berndt, Meakins, & Angelo 2013). The checklist also invites the parent to report any item in another language, for example if the child knows the item in one of the more than 20 languages of the Katherine NT region (which many local children may have as heritage language(s)), or indeed a language from another place (e.g. a world language, or an Indigenous language from another part of Australia). This approach is intended to cater respectfully to the great diversity of language backgrounds in Indigenous families in the Katherine NT region. For more details on the local multilingual situation, newer emerging language varieties, the local value placed on 'baby talk' (local infant-directed speech styles) and on systematic gesture (termed 'handsign', locally, and henceforth in this paper), all of which are invited within the Early Language Inventory (ERLI) checklist, see Jones and Meakins (2013), Meakins (2012), O'Shannessy (2015).

Aims of the study

Few tools currently exist for culturally and linguistically appropriate assessment of early communication in Indigenous children in Australia. In this paper we describe the process and outcome of adapting a CDI for the Katherine NT region, and children's scores on a new tool, by age, parent concern, and whether they are combining words. The tool is called ERLI and is an authorised short-form adaptation of the MacArthur Bates CDI (Words & Gestures) for children aged 0–3 years. ERLI was developed collaboratively in partnership with local Indigenous people and local education and health services, to be of practical use in health, education and research, particularly in the 0–3 age range where it is an increasing priority to ensure early identification of children with communication difficulties and early support in hearing, speech and language.

The aims of the study are (1) to develop a parent report checklist of first words and handsigns for Indigenous children (0–3 years) growing up in the

Katherine NT region, (2) to describe how it differs and offers new content compared with previously approved CDIs, and (3) to provide initial data on how checklist scores are related to child age, parent concern, and age of first word combinations, plus initial item analysis.

Method

Study design

This research received ethics approval from the Human Research Ethics Committees of Western Sydney University (H9976, H12120), and Hearing Australia (Proc 17.3). Local approvals were also obtained from Menzies School of Health Research (2014-2140, 2018-3222), Northern Land Council, and Aboriginal Medical Services Alliance Northern Territory.

The research approach was descriptive rather than psychometric, due to a small sample size. The study comprised two phases: (1) interviews to develop checklist items (2014–16) and (2) checklist administration to 33 parents (2017–18).

In Phase 1, the goal was to identify approximately 100–120 early vocabulary and handsign items which would be widely recognised by parents in towns and communities of the Katherine NT region (i.e., that would have ‘translation equivalents’ in Aboriginal ways of speaking English, Kriol, and traditional languages in the region). This would enable ‘total conceptual vocabulary’ (TCV) scoring (Pearson, Fernández, Lewedeg, & Oller, 1997; Gatt, O’Toole, & Haman, 2015). In Phase 1, we also strove to meet the requirements of MacArthur-Bates CDIs for a range of age of acquisition, a balance across word categories, and exclusion of words that are overly local or ambiguous in part of speech.

In Phase 2, the goal was to use the resulting checklist with approximately 30–40 parents and caregivers of Indigenous children aged 0–3 years, from the Katherine NT region, to provide initial data on early communication development and the relationship of checklist scores to child age, parent concern, and first word combinations, and a basis for initial item analysis.

Participants

All participants were recruited through researchers’ social networks, and in Phase 2 through advertisement at Wurli-Wurlinjang Aboriginal Health Service, the town clinic. In Phase 1, participants were seven Aboriginal mothers from Barunga Community and the town of Katherine. In response to questions about domains of everyday life (feeding, caregiving, family, activities) the mothers (mean age 24 years, range 21–30) recalled and discussed the first words and handsigns of their infants (mean age = 17 months, range = 14–23; five girls, two boys). All mothers were fluent speakers of Kriol and English, and reported

using Kriol to their infant, with two also using traditional languages (Mayali, Wubuy). Other caregivers (father, aunt, uncle, grandparent) reportedly used other languages to the infants as well, including Dalabon and Jawoyn.

In Phase 2, we used the checklist generated from Phase 1 in individual conversations with 33 parents/caregivers of 36 other Indigenous children. Twenty-five were the biological mother of the child; the other eight were three fathers, two maternal aunts, one maternal grandmother, and two non-kin foster mothers. These participants lived in Katherine and nearby communities, Rockhole and Binjari. Some had only recently moved to Katherine from remote eastside communities, high mobility being very common. Caregiver level of education ranged from Year 7 to VET (vocational education & training) and university. Eight participants had completed Year 12 (plus a VET certificate for four, and a university degree for two). Twenty-two participants had not completed Year 12 (i.e., the final year of high school in Australia), but four of these had completed VET certificates. Three participants did not provide education information.

Home linguistic contexts varied within the sample. Ten participants reported their homes to be English-only. (Two referred to Aboriginal English specifically, though this is often just named ‘English’ and is likely not accurately differentiated from Standard Australian English in these data.) Both foster mothers reported speaking only English at home. Five participants spoke only Kriol at home. Eight participants reported a bilingual home language environment of English and Kriol, while a further five reported that in addition to English and Kriol, they also had traditional languages (such as Gurindji, Warlpiri, Miriwoong, Garrawa) or multiple creoles spoken at home (Kimberley Kriol, Torres Strait Creole, Ngarinyman Kriol (also known as Westside Kriol or Gurindji Kriol)). Eight participants did not include English as one of the languages spoken at home. Twelve participants did not include Kriol as one of the languages spoken at home.

Procedure

A standardised process ensured informed consent and voluntary participation. Each individual interview lasted 20–40 min, was audio-recorded (if permitted), and held at the participant’s home, in a public space (e.g. park), or at clinic. Interviews were held in English and/or Kriol, and items in other languages were invited throughout interview. Rather than requiring the parent to fill out the form, we used a conversational format to ensure that the target item was clear, as Kriol is predominantly a spoken language for most speakers rather than a written language.

Data analysis

Phase 1 yielded a 120-item checklist, through a long development process. For each of the CDI categories (Animals, Vehicles, etc.) we first identified items from our interview data which met the CDI requirements and were produced by more than one infant in our data (yielding a total 121 items). The analysis of interview data was also informed by the lived experiences of our team: local Aboriginal community members, themselves parents and/or grandparents, and non-Indigenous linguists with 10–25 years' experience working and living with Aboriginal people in the region. Based on our combined knowledge we included 19 extra items through team discussions. These extra items were common words which parents had simply not reported e.g. *kas/barnka* (cousin), *sneik* (snake), *pleiplei* (play), *andaweya/blumij* (underpants), *likwan* (small), *naidaim* (night), *ai/me* (I/me), *najawan/mor* (another, more), *bye/bobo/marndaj* (goodbye), *tharrai* (that way), *dije* (this way), and *hu* (who). This enabled us to include words from all CDI categories, including Action Words, Time Words and other grammatical words. At this stage we also added to existing items other commonly known variants in the region such as *yagai* (ow, hurts) and *nyutj* (blow your nose). From the resulting 140 item checklist we finally removed 20 items which in subsequent pilot testing turned out to be less widely known than we had expected, or which were otherwise problematic e.g. tended to be regarded as synonyms for other items.

The 120-item checklist was then used in Phase 2, with 33 parents. The Phase 2 data were the items reported for expressive and receptive vocabulary and handsigns, plus the child and family demographic data. For each child, a receptive and an expressive score (i.e., total conceptual vocabulary out of 120) were calculated. Data were analysed and graphed in RStudio (version 1.1.463).

Result

Description of the tool

The ERLI checklist is reproduced in [Supplementary Appendix 1](#). ERLI comprises 120 items which are presented in two columns: the first for Aboriginal ways of using English, and the second for Kriol varieties. The third column offers space to write the item in another language if the child uses or understands it in that language (e.g. a traditional language like Gurindji, or a world language like Thai). ERLI contains the major communicative structure categories that are in the original CDI, as recommended by the CDI Advisory Board (2015a, 2015b). It is an adaptation of the CDI: Words & Gestures, in short form. ERLI assesses expressive and receptive vocabulary, and handsigns. It includes items from the full range of semantic categories in the original CDI (e.g. Sound Effects, Animals, Vehicles, and so on). There

is a yes/no question as to whether the child has begun to combine words into short utterances.

A set of demographic questions at the end ask for background about the infant and their family, including questions about the child's date of birth, the socio-economic status (SES) of the family and the health status of the child, including any hearing loss and/or otitis media (middle ear infection). Finally, parents are asked if they have any concerns about their child's speaking or listening; the last two questions bringing data that can potentially improve the utility of ERLI as a screening tool (Klee, Pearce, & Carson, 2000).

Comparison of ERLI with two existing CDIs

The ERLI checklist provides unique content, above and beyond previously authorised CDIs; unique content is recommended by the CDI Advisory Board (2015a, 2015b) for new adaptations. We offer two comparisons: with the American English CDI: Words & Gestures (short, 90-item form) by Fenson et al. (2000), and the OZI: Australian English Communicative Development Inventory by Kalashnikova, Schwarz, and Burnham (2016), a long 558-item form. The [Supplementary Material](#) summarises the items that are shared vs unique between ERLI and the CDI: Words & Gestures (short form) (Section 1) and between ERLI and OZI (Section 2).

There is strong evidence of the new content in ERLI, when compared with the CDI: Words & Gestures (Short Form). The new content includes 71 new semantic items which are listed in Supplementary File, Section 1, second column, labelled 'items only on ERLI'. English word translations are provided for ease of reading. There is even more new content in ERLI than this suggests, in that in ERLI we also provide the translation equivalents in Kriol and allow for items to be scored as correct if known in a third language (e.g. a traditional language). Substitutions (17) of a different dialect form for Aboriginal ways of using English are indicated in brackets in the third column, under 'shared items'. Items which do not appear in ERLI but do appear in the American English CDI: Words & Gestures (Short Form) are listed in the final column. These items did not come up as commonly known in interviews with parents. For example, neither children nor adults commonly wear socks in northern Australia. Some sound effects like *choochoo* were also identified by parents as unfamiliar and not used with infants. Finally, ERLI provides new content in including eight handsigns (no gestures are included in the short form as published in Fenson et al., 2000).

There is also strong evidence of new content in the ERLI when compared to the OZI. OZI assesses spoken expressive vocabulary only. ERLI also assesses receptive vocabulary and contains handsigns as we have seen. There is an overlap of 76 items which have the same basic semantic meaning. There are minor substitutions (i.e., modifications) to the dialectal

form of 20 of these 76 shared items. In terms of brand new content (i.e., additions), there are 35 words and eight handsigns on ERLI which are not on the OZI. This is due in part to the inclusion in ERLI of time words, pronouns, question words and demonstratives and spatial terms (none of these categories are included in the OZI). Among the 35 new words are also common words in use with infants, and culturally and environmentally relevant words on the ERLI which are not on OZI. These include, for example, *wuduwudu* (a sound effect to make a child fall asleep, or what a child says when they are sleepy), *clothes*, *poo/guna*, *wee*, *cup*, *floor*, *river*, *clinic*, *cousin*, plus terms for culturally familiar routines (such as making a child dance or kiss, or warning them of danger), action words used commonly in directives (*blow your nose*, *go away*, *come back/here*, *put or put back*), and the demonstratives and other location words that are also in everyday use with even young children who are expected to learn an increasingly independent understanding of the layout of their community and their ancestral lands.

Response patterns on ERLI in the present sample

In this section we offer initial observations about response patterns on ERLI. Drawing on data from Phase 2, we computed total scores (out of 120 items) for receptive and expressive vocabulary, for each child. Figures 1(a,b) display total expressive and receptive scores, respectively, as a function of child age and parent concern. We see that by 12 months of age, children in the sample were reported to say and understand at least some items in ERLI. When looking at the age range one to three years, scores were typically higher for older children. Children were reported to understand more words than they said. At age three years, children whose parents were not concerned about language development tended to have expressive scores of approximately 100–120.

ERLI scores in relation to child age

There were positive associations between child age and expressive/receptive scores on ERLI. A Pearson product-moment correlation coefficient was computed to assess the relationship between child age and expressive score. There was a positive correlation between the two variables, $r=0.672$, $n=36$, $p<0.001$. The 95% confidence interval for the correlation was (0.484, 1.000). A Pearson product-moment correlation coefficient was also computed for the relationship between child age and receptive score. There was a positive correlation between the two variables, $r=0.596$, $n=36$, $p<0.001$. The 95% confidence interval for the correlation was (0.380, 1.000).

ERLI scores in relation to parent concern

Some children whose parents had concern had lower ERLI scores. In Figure 1(a), for the children whose parents had concern, four children had points which lie off to the lower right of the distribution. The scores of these children, aged late twos to late threes, had expressive scores which are more similar to children aged one year younger whose parents had no concern. In addition to these four children, the parents of a further two children had concern about their speaking or listening. These two children had similar scores to other children their age although they may be on the lower side of the distribution relative to children whose parents had no concern. In Figure 1(b), three of these children had points which lie off to the lower right of the distribution.

ERLI scores in relation to age of first word combinations

Children were reported to combine words from about age two years or very shortly before, corresponding to an expressive score of approximately 60, as shown in Figure 2. Two out of the four children whose parents had concern, and whose expressive scores lie

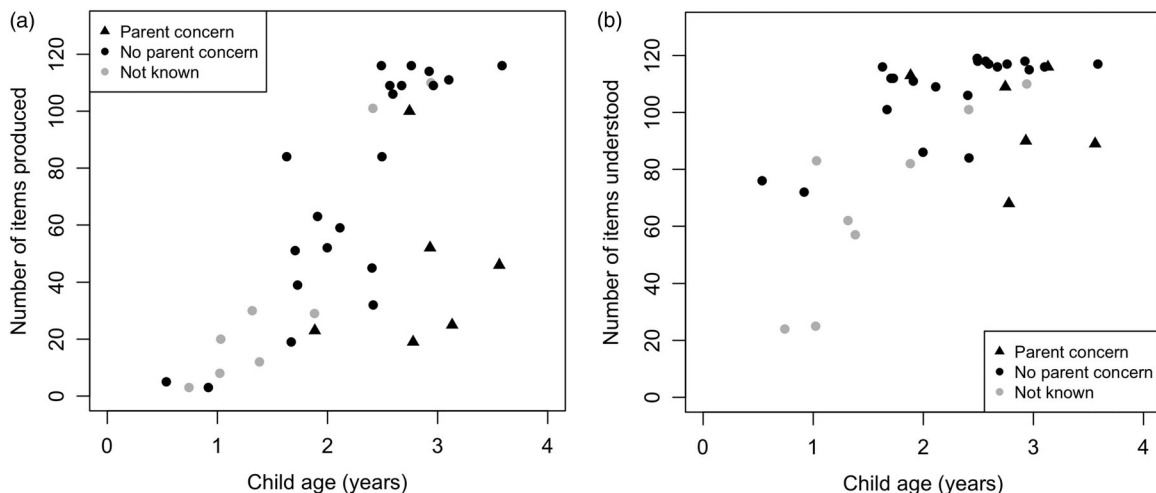


Figure 1. (a) Expressive scores by child age and parent concern. (b) Receptive scores by child age and parent concern.

out to the lower right of the distribution (compare Figure 1(a)), were not yet combining words.

Item analysis: Expressive scores as percentage of sample

The response data from the current sample suggests that ERLI items have a range of age of acquisition. We

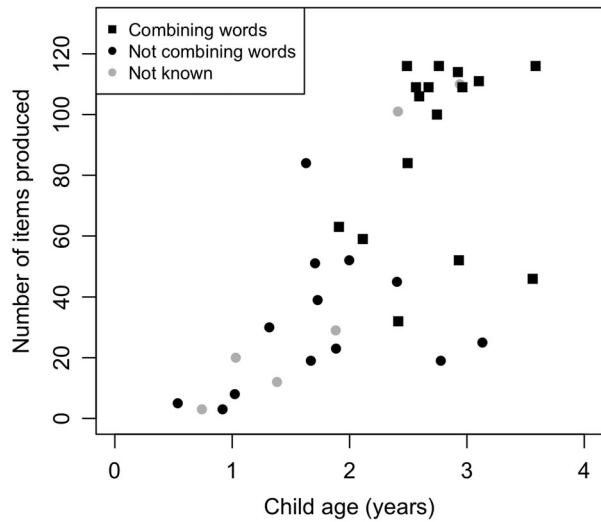


Figure 2. Expressive scores by child age and word combining.

do lack sufficient data to calculate age of acquisition for each item on ERLI. Instead, Figure 3 (with full data per item in Supplementary Material, Section 3) shows the proportion of items produced by >50% of the children in the sample (46 items, 38.3%, ‘early acquired’), by 30–50% of the sample (60 items, 50.0%, ‘mid acquired’), and by <30% of the sample (14 items, 11.7%, ‘late acquired’). The justification for the shorthand references to the early, mid, and late acquired items is that percentage of the sample is a reasonable proxy for age of acquisition, because words known by more children are words known by younger children as well as the older children. The colours in Figure 3 (see legend) refer to the CDI categories, showing how items from those categories are early, mid or late acquired.

In most categories there is a spread of items across early, mid or late acquired. The main exceptions are Action Words (all mid) and Time Words (all late). In the categories of grammatical items, which are a mix of mid and late, there are some small numbers of items (one Pronoun, one Quantifier, two Question Words, three Time Words, eight Locations).

Discussion

The results of our study show that the final ERLI checklist has new content compared with other

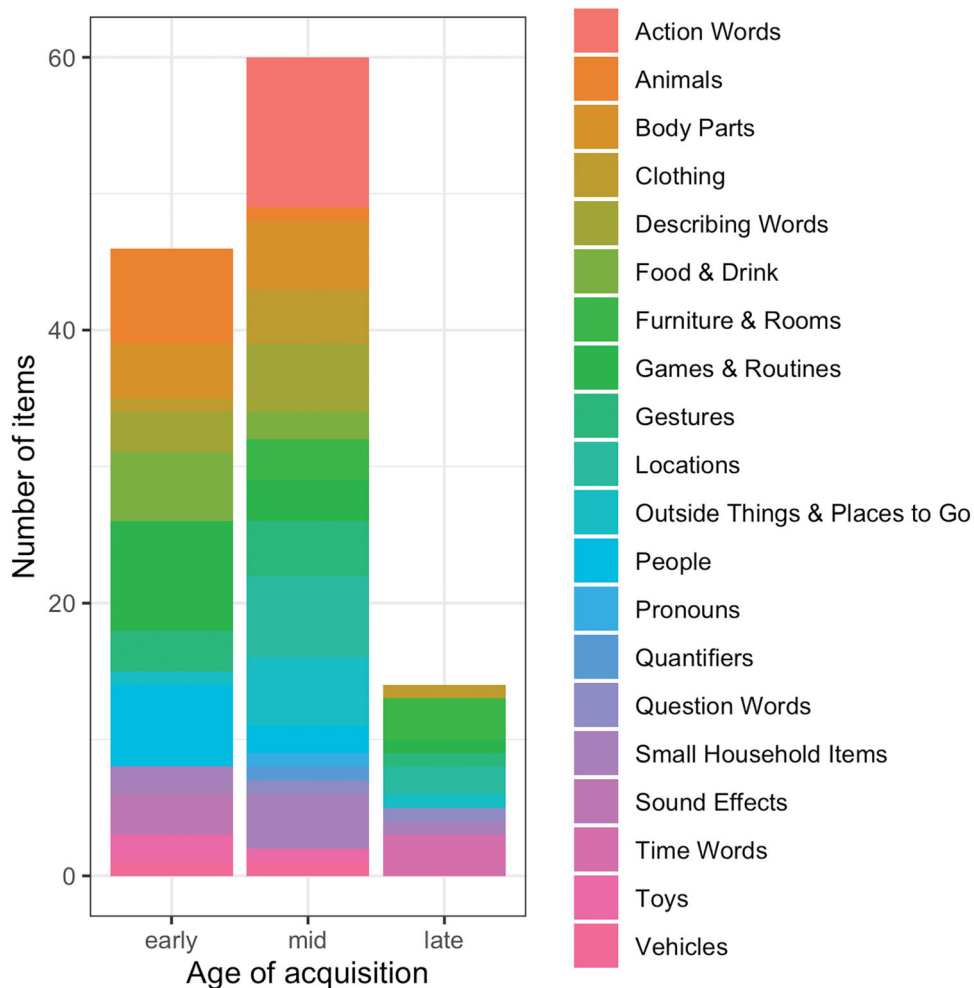


Figure 3. Items by Communicative Development Inventories (CDI) category and age of acquisition.

existing authorised CDIs for American English and Australian English. Second, the result of trialling ERLI with our initial sample from the Katherine region of the Northern Territory showed that for many young Indigenous children, acquisition of items on ERLI starts before 12 months of age, increases in rate in the second year of life, and reaches a maximum ceiling level of performance around age three years.

The pattern of results from our initial sample suggests that for this remote population we have succeeded in developing a tool that is linguistically, culturally, and developmentally appropriate. With such a tool, most children are positioned along an age-related function, and reach scores at the upper end of the possible range at the oldest ages for which the tool is intended. This pattern of data is very different from the many demonstrations in the literature (e.g. Pearce & Williams, 2013, for school-aged children) that Indigenous children tend to have low scores when assessed with standardised mainstream assessment tools that presuppose Standard Australian English as a home language.

The data from our initial trial sample also included six children whose parents expressed concern about their speaking or listening, and the ERLI expressive scores for four of these children were noticeably lower than their age peers. This suggests that it may be possible to use ERLI to help identify children with hearing loss and/or speech-language difficulties, and sometimes this may corroborate parent concern. Not all of the children whose parents expressed concern, however, had markedly low expressive ERLI scores. Two appeared to lie in normal range. This may reflect well-known variation in how easily parents can report vocabulary, regardless of parent SES level (Arriaga, Fenson, Cronan, & Pethick, 1998). Alternatively perhaps these children have typically developing vocabulary but problems in another domain (e.g. articulation, pragmatics).

Clinical implications

The ERLI checklist yields raw scores (and qualitative data) to measure expressive and receptive development in vocabulary and handsigns from just under 12 months through to about three years. ERLI may be used and reused to measure change over time in individuals, including in older children with language delay (up to about four years old). From about two years of age, ERLI has potential to help identify children with hearing, speech or language difficulties, at which point many children in the current sample produce around 60 items and are starting to combine words. Finally, ERLI offers specific vocabulary items for discussion with parents, which can aid in therapy goals and two-way learning about the language context at home. The actual success of ERLI as a clinical tool will likely depend critically on the cultural experience, awareness and skills of the individual speech-

language pathologist, their knowledge of the local language and cultural context but also their ability to invite the parent(s) to report home language, to interpret the answers, to notice when their communication with parent(s) is not working, and to collaborate to repair the interaction, and ensure a culturally safe interaction. It thus remains for future clinical work and research to determine how well ERLI does work for families served by a typical Australian speech-language pathologist from a mainstream non-Indigenous cultural and linguistic background.

Limitations

This paper reports data from a relatively small sample of children in a particular geographic and cultural area. The focus on tool development within a local context has however allowed us to develop a new tool which appears to be culturally and linguistically appropriate and respectful of linguistic diversity within this region.

Future directions

New assessment tools, such as ERLI, are often trialled in new contexts. It is an open question for future research to what extent the semantic items on ERLI may – or may not – have ‘translation equivalents’ across the great tapestry of cultural and linguistic diversity that characterises Indigenous Australia, in urban, regional and remote areas. Future work could evaluate ERLI as a screening tool, use ERLI to probe the relationship between input and acquisition (cf. Pearson, Fernández, Lewedeg, & Oller, 1997) and measure children’s early learning in Indigenous languages (cf. O’Toole & Hickey, 2017, on endangered languages elsewhere).

Conclusion

In conclusion, this paper describes the iterative development of ERLI, a parent checklist of first words and handsigns. The development process involved high levels of collaboration with Indigenous families from the Katherine Region, Northern Territory, Australia. ERLI offers new content compared with other CDIs, featuring locally familiar items in Kriol and Aboriginal ways of using English, and the opportunity to recognise children’s knowledge of words from other languages, multilingualism being the norm for Indigenous children in this region.

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Disclosure statement

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Supplementary material

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