Devoicing My Cognition or Colonising my Cognition?

Sue Hanson
Goldfields Aboriginal Language Centre Aboriginal Corporation

Introduction

The overarching themes of this First Nations' Language conference are *Survive, Revive, Thrive*. This paper addresses the theme of *Survive* and how current English-only educational instruction damages first language speaking children's cognitive development through language loss and the resultant loss of neuroplasticity.

Current Commonwealth and State educational policy does not provide opportunity for child who speak an Indigenous first language, to continue their linguistic development, and thus robs the child of the opportunity to develop high level cognitive capability. The child's very cognition is colonised.

Background

Since 1990, both Commonwealth and State educational policies directed that all children must learn literacy and numeracy in Standard Australian English. For some time it was formally prescribed as, *'the first 4 hours of a school day must be in English'.* [1]

Prior to the formal 1990 policy shift, there were a number of Western Australian schools which taught initial literacy in the children's first language, with the transfer to English literacy when the children were literate, and at the commencement of the Piagetian period identified as an abstract phase of development. These schools were able to register as an educational sector, the Aboriginal Independent Community Schools (AICS) sector, distinct to the Government educational sector, Catholic Sector and Independent sector, based on their distinct outcomes. The aim of the AICS sector was to teach a high level of bilingual competency and literacy, and advanced linguistic and meta-cognitive capabilities, amongst a raft of affirmative cultural practices such as cultural capability, knowledge, skills and respect. Strelley, Kulkarriya, Punmu, Parnngurr and Warrimbah Aboriginal Independent Community Schools used the children's first language as the means of educational instruction, and Yiyili School had a bilingual program. There were a number of schools in the Northern Territory which also taught initial literacy in English or were bilingual . All of these schools achieved outstanding educational outcomes prior to the 1990 policy change.

The policy shift was driven by political rhetoric around the need for First Nations' children to be ready for employment by speaking English. Today's National curriculum website states,

> *English is the official language of Australia and the main language of instruction.*

[1] Simpson, Caffery and McConvell 2009

The policy's prescription assumed that if English was the only language for instruction, the children would develop high level English production and reception ability, and the ability to think in English. The children's first language is often referred to as a 'home language', ignoring the fact that it is the language the children think in, their *cognitive language*.

A great number of linguists, educationalists and even child neurologists, produced scientific outcomes disproving the premises of the English-only educational policy. The landmark paper, '*Gaps in Australia's Indigenous Language policy: Dismantling bilingual education in the Northern Territory*', by Simpson, Caffery and McConvell states,

> *Young children learn best when taught through their mother tongue. This commonsense principle has been supported by decades of research on bilingual education for children who don't speak the dominant language. The research has also shown that there are positive effects on children's cognitive development if they are encouraged to become strong bilinguals.*
>
> *(Simpson, Caffery and McConvell 2009)*

Simpson, Caffery and McConvell's paper presents a full and accurate account of the history of the bilingual policy change, the premise behind it, and the breech it created in children's linguistic rights.

Despite scientific proof of the damage the English-only instruction policy would do to first language speaking children's educational outcomes, it was ignored and the policy has remained current, in various iterations.

Inge Kral's thesis document, 'Writing Words-Right Way! : Literacy and social practice in the Ngaanyatjarra world[2]', provides a detailed ethnography of literacy as related to the Ngaanyatjarra community, in a remote, first language speaking context. Kral suggest,

> *'…that the discourse of failure surrounding literacy and learning amongst Aboriginal youth can be turned into horizons of possibilities, if the right approaches are found.'*
>
> *Kral 2007*

A second premise behind the policy appears to be that initial literacy and educational instruction in a child's traditional language would compromise the acquisition of the English language.[3] In effect the policy is thinly disguised ethnocentric rhetoric positioning English as the superior language for educational instruction and cognition.

The English instruction-only policy is now over 30 years old and impacting the grandchildren of the students from 1990. This paper examines the impact of that

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[2] Writing Words-Right Way! : Literacy and social practice in the Ngaanyatjarra world'

[3] Simpson et al 2009

policy thirty years later, on the cognition of First Nations children who speak an Australian language as a first language. The aim of this paper is to stimulate research and data collection on the effect of this English instruction-only policy.

Closing the Gap Outcomes

Early in the 2000s, life inequities for First Nations peoples were excruciatingly apparent resulting in the release of the *Social Justice Report 2005*. This report identified significantly reduced health and life expectancy outcomes. In response, the Rudd Government established the National Indigenous Health Equity Council in 2008 and established six Closing the Gap targets with the aim of addressing these inequities within 25 years. This policy became known as the Closing the Gap policy. There were a number of Closing the Gap outcomes which relate to the target *to halve the gap in reading, writing and numeracy achievement for children within a decade*. [4]

Outcome 3: Children are engaged in high quality, culturally appropriate early childhood education in their early years.
Outcome 4: Children thrive in their early years.
Outcome 5: Students achieve their full learning potential.
Outcome 14: People enjoy high levels of social and emotional wellbeing.
Outcome 16: Cultures and languages are strong, supported and flourishing.

Outcome 4, 'Children thrive in their early years' , has tracked a continued downward movement from 2018 to the present.

> *Nationally in 2021, 34.3 per cent of Aboriginal and Torres Strait Islander children commencing school were assessed as being developmentally on track in all five AEDC domains. This is a decrease from 35.2 per cent in 2018 (the baseline year).*

Australian Government Productivity Commission Closing the Gap Dashboard Sept 2023

Whilst indicators in the Closing the Gap outcomes are not an accurate measure of First Nations' children's achievement for a myriad of reasons, they provide the only transparent and indicative measure of these children's educational outcome as tracked over time.

NAPLAN 2023 reading results, for year 3 students of a First Nations background, indicate similar low scores with 30.5% of students requiring support and 31.6% of students developing, which indicates these children are not proficient at age level. The total percentage of Indigenous students at year 3 who are not at age

[4] https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook44p/ClosingGap

level reading is 61.6%. The figures for year 5, 7 and 9 predictably further magnify these low scores. [5]

The results do no indicate whether these children have a traditional language for a cognitive language, or English, Kriol or Aboriginal English.

NAPLAN achievement for Year 3 in reading by student background, Australia 2023

Subgroup	Average NAPLAN score (confidence interval)	Exempt	Needs additional support (NAS)	Developing	Strong	Exceeding
All	404.6 (±1.1)	1.9%	9.1%	22.2%	48.5%	18.3%
Male	396.4 (±1.2)	2.5%	10.7%	24.4%	46.3%	16.1%
Female	413.1 (±1.1)	1.2%	7.4%	20.0%	50.8%	20.6%
Indigenous	332.9 (±2.7)	2.9%	30.5%	31.6%	30.8%	4.2%
Non-Indigenous	409.9 (±1.1)	1.7%	7.5%	21.5%	49.9%	19.4%
Major cities	413.3 (±1.3)	1.9%	7.1%	20.5%	49.8%	20.6%
Inner regional	390.4 (±1.9)	1.6%	11.3%	26.1%	47.4%	13.5%
Outer regional	376.0 (±2.8)	1.8%	15.4%	28.6%	44.0%	10.3%
Remote	352.8 (±9.1)	1.7%	24.5%	28.5%	37.0%	8.4%
Very remote	293.1 (±12.1)	1.5%	49.0%	26.0%	19.8%	3.6%
Non-LBOTE	401.6 (±1.1)	1.5%	9.4%	23.2%	48.8%	17.1%
LBOTE	412.5 (±2.0)	2.5%	8.1%	19.9%	48.2%	21.3%

This paper addresses one facet of the failure of educational sectors to provide appropriate education for Indigenous children with a traditional language as a cognitive language, that of English-only instruction, and the implications for the child. The outcomes will be examined through a neurolinguistic lens to identify the cognitive repercussions of the English-only instruction policy of children's cognitive attainment.

First Language Acquisition

There are three significant educational theories about first language acquisition that will be used to examine the affects of the English-only instruction educational policy.

This paper doesn't cover the equally important topic of the linguistic rights of language-speaking children or Community, and that is covered in a second paper by the author, 2023.

Piaget's Cognitive Language Acquisition Theory

Piaget's acquisition of language theory can be summed up with the phrase; *thought precedes language*. Piaget theorized that children's language receptive ability far precedes their productive ability. Children need to understand a concept before acquiring the linguistic capability to express it. Indeed, the desire to express a thought drives the acquisition of the linguistic skills to do so.

Language acquisition is based on the maturity of the brain and children pass through distinct phases of development, with their receptive capability a stage ahead of their productive ability, thereby driving their linguistic acquisition.

[5] NAPLAN website Sept 2023

Piaget believed that children must have the ability to explore the world for themselves in order to fuel their cognitive ability which and in turn drives their language acquisition. Language acquired then fuels increased cognitive ability which then drives the quest for more language acquisition, and on and on the process goes.

Language acquisition is communication driven.

Vgotsky Cognitive Language Acquisition Theory

Vgotsky's language acquisition theory differs from Piaget in that he proposed that cognitive capability and language ability kept pace and are acquired, one in support of the other, proposing the zone of proximal development (ZPD). Vgotsky's acquisition theory can be summed up with the phrase; *thought becomes verbal and speech rational.*

This theory suggests that social interactions help a child to develop their ability to use language. That as a child socializes, this promotes both the cognitive ability of the child and the acquisition of language in a mutual manner. Thought and speech are inseparable as cognitive capability develops as language is internalized. The two capabilities then continue to tango together, ever forward.

Language acquisition is social interaction driven.

Chomsky Inherent Language Acquisition Theory

Chomsky's theory differs slightly from Piaget and Vgotsky in that he posits that language acquisition is genetically driven, rather than communication or socially driven. Chomsky's *Critical Period Hypothesis* is based on the premise that language acquisition is a trait that is passed down by genetics. Chomsky suggests that language acquisition is hard wired through genetics and that a baby is biologically predisposed to acquire language by certain ages and stages of development. This theory indicates that there is an inherent language acquisition device (LAD) which switches on at birth, operates through childhood, and eventually runs low by puberty.

Language acquisition is genetically driven.

Language Acquisition Agreement

All three language acquisition theories agree that there is a predisposition to intense and uniform language acquisition during early childhood, with an eventual reduction of innate capability by late childhood. All theories indicate the critical interplay between social interaction and language acquisition which leads to cognitive development and neuroplasticity.

Linguistic Competence and Neuroplasticity

Linguistic competence is a person's subconscious knowledge of the rules governing the formation of speech in a language, and the ability to apply these rules to a wide variety of discourse situation.

Neuroplasticity is the ability of the brain to change, respond and at times, to rewire through growth and reorganization. It can be referred to as cognitive pathways, and the ability to re-organise these pathways in ever increasingly efficient ways which allows information to run quicker and more effectively. High level neuroplasticity leads to fast thinking, the ability to absorb and extrapolate information, to form solutions, to adapt, imagine, focus, and problem solve.

First language acquisition relies on the neuroplasticity of the infant's brain to absorb and retain language. Neuroplasticity then enables the infant to apply language, in the first instance to linguistic structures which have been heard, and eventually to linguistic structures that have not been heard by the infant but have been constructed from the syntactic input. Neuroplasticity enables a child to comprehend and also construct novel utterances, of increasing syntactic complexity.

As a child hears speech, or in the case of sign language speakers, observes hand language, neural syntactic networks are constructed which the child constantly adds to, trims, re-routes and develops as further linguistic material is inputted.

All three of the above language acquisition theories acknowledge that the right kind of language input is needed at specific times in a child life, in order for the child to add language to their repertoire, and in turn, develop the neuroplasticity to use and develop new pathways capable of processing new language input. Language input leads to the development of synapsis, that leads to further neuroplasticity which leads to the capability of processing more language input. And around it goes again.

A baby's brain grows more than 1 million new neural connections each second.[6] Not all these new neurons remain as many are pruned when further information is obtained and new neural pathways developed. This intense neural growth continues for the first 3 years of life before slowing down with neural growth late in life being little more than replacement of existing neurons. [7]

Lennenberg (1967) suggested that the critical period for this input was between 2 and 13 years of age, in order for a child to develop native linguistic competence.

> '*…first language acquisition relies on neuroplasticity. If language input does not occur in this time, the individual will never achieve full command of language.'*

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[6] Harvard University *Brain Architecture*
[7] ad ibid

Lennenberg's critical period has long been held as the standard understanding and applied to educational theory and practice for 6 decades.

Vgotsky (2017) theorized that child language acquisition is inextricably linked to the development of prefrontal synthesis (PFS) capabilities. Prefrontal synthesis is the ability to consciously and purposefully process new mental images in a synchronized manner. He suggests that the ability to perform prefrontal synthesis will be inhibited if this input is not acquired during the critical period. Prefrontal synthesis is the way new imaginary memories are formed, or high order metacognitive processing is undertaken. Without well developed prefrontal synthesis, the child's ability, as an adult, to perform high order metacognitive processing, is severely diminished. Therefore a lack of language input during this critical period leads to correlating diminished metacognitive ability as an adult. Vgotsky further suggests that once the critical period is over, the period of prefrontal synthesis development is also over due to the process of lateralisation. Lateralisation is when the brain determines where information will be stored, in which hemisphere, and is a process that closes down once complete.

To put this is computer terminology, a child is born as a computer, with great capability. A rich linguistic environment builds the hardwiring into the child. Once childhood has been completed, the computer build and hardwiring is complete. The child as an adult, can then only add software to their hard wiring. If the hardwiring is not there, no amount of software will work, no number of patches will fix the system if the system is incomplete.

More recent research has studied the ages of the critical language acquisition period and some of the results are quite shocking in that they indicate that not only the first year of the child's life is the most critical period for first language acquisition, but that the first 4 months of a child's life may determine if the full syntactic repertoire of a language is acquired by a child. Children who have a deficit language input struggle in later life with morpho-syntax.[8]

Friedmann and Rusou (2015) reviewed research to identify the critical period for first language acquisition.

> *We find that the acquisition of syntax in a first language has a critical period that ends during the first year of life, and children who missed this window of opportunity later show severe syntactic impairments.*
>
> Friedmann and Rusou (2015)

Evidence that supported these findings can be found in research undertaken with children who lose their hearing around age 12 months. The research found that

> *…children who received normal input during the first year and lost their*

[8] Lebrun *Victor of Aveyron: a reappraisal in light of more recent cases of feral speech.*

hearing later can show normal syntactic development.

Meisel (2013)

The research showed that Lennenberg's critic period of 2 to 13 years was too late. In fact, recent research suggests that the critical period is birth to aged 4, with age 4 being the upper limit for acquisition of a second language with native-like capabilities.

> *Even around the age of four years, some aspects of a second language are not acquired as native anymore, and the acquisition already resembles that of adults who acquire a second language.*
>
> Meisel 2013

Recent research also suggests that the process of lateralization, which is the brain's positioning of a language's syntax within a hemisphere, usually the left hemisphere, may be completed by the age of five years. [9] [10] The end of the lateralization period brings to a close the intense neuroplasticity found in very young children. The prefrontal synthesis capabilities are now predetermined, for life, at age 5 years.

This loss of language acquisition neuroplasticity has evolved to occur after a language has been acquired. This enables a child to retain and focus on the linguistic structures they have acquired, allowing for consolidation, development, protection and stabilisation of their first language. The child now seeks the heavy software input for their hardwired linguistic brain structures.

Implications for an Interrupted First Language Acquisition

Chomsky stressed that there were two critical elements needed for the complete acquisition of a first language; a neurologically prepared mind and rich linguistic input during the critical acquisition period. Recent research supports this and has further identified that

1. The critical period for syntactic acquisition is birth to age one year, with birth to four months of age proving to be particularly critical for syntax acquisition,
2. The critical period for developing prefrontal synthesis capabilities is birth to age 5,
3. The lateralization process is complete by age 5 years,
4. A child is hard wired for a first language by age 4 years and any subsequent language will be acquired as a second language,
5. Linguistic neuroplasticity capability for life is determined by age 4-5 years.

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[9] Krashen, Harshman *Lateralization and the Critical Period.*

[10] Krashen, Harshaman *Lateralization, Language learning, and the Critical Period: some new evidence.*

These findings raise a number of questions pertinent to the learning environment provided for traditional language speaking Indigenous children:

1. What happens to a traditional first language speaking child's cognition and language acquisition when the child enters an English-only instruction environment and does not receive the rich first-language linguistic input after age 5, that the brain has been lateralized to process?

In computer terms, what happens to the child's linguistic capability if they do not receive the software programs for their hardwired computer?

2. What happens to a child's prefrontal synthesis capabilities if the child's first language acquisition is interrupted?

In computer terms, can the child think imaginatively without the software programs being installed?

3. What happens to a child's developing neuroplasticity if the child's first language acquisition is interrupted?

In computer terms, can the computer problem-solve only with the hard wiring and without the software programs being installed?

The current policy of English-only educational instruction for children with an Indigenous cognitive language, has proven to be at best, ineffective, and at worst, devastating for children as indicated by the Closing the Gap and NAPLAN results. There are several factors linked to the English-only instruction policy, which align to create a perfect environment of failure for these children.

1. The children are neurologically conditioned for input in their first language.

2. The children on entry to school at age 3 to 4, are past the period for native syntactic acquisition of a second language.

3. The lateralization period is closed or near closing by school age and the brain has set in place the first language defense processes thereby rejecting the possibility of native-like second language acquisition.

4. The children have been neurologically conditioned for neuroplasticity in their first language.

5. At age 5, children are not cognitively prepared for second language acquisition, as acquisition of the first language is not complete.

Second Language Acquisition of English

A long understood educational premise has been that children can acquire a second language intuitively up until around the age of 13 years. After this, language acquisition must be a cognitive process, in that the individual needs to

work at memorizing a language. The basis for this premise has been that if the individual studies, practices, works hard, and is immersed long enough, a native-like capability in the second language will develop. This premise has been applied to Indigenous children with regards to English. If the child tries hard enough, they will learn and speak English well, often in an English deficit environment, with teachers unskilled in English as a Second Language teaching capabilities, and whilst the child is immersed in a remote community with few English speakers.

Recent studies support the premise that vocabulary can be learnt as an adult but this is a cognitive process and is reliant on pre-existing linguistic neuroplasticity. Speech production and grammar may never become native-like.[11]

> *'...meaning of the new language (L2) is attained via already existing knowledge from the native language (L1) serving as a mediator and memory aid.'*
>
> Steber and Rossi 2021

The recent research by Meisel which indicated that by age four years, aspects of a second language can no longer be acquired as native, refutes this long held educational premise.

The conclusion that can be drawn from the research is that in order to acquire a second language after the critical acquisition period, what is needed is

1. a fully acquired first language's syntactic structure, which leads to,
2. high functioning prefrontal synthesis capabilities, which leads to,
3. linguistic neuroplasticity, which leads to,
4. well developed metalinguistic and metacognitive abilities, which lead to,
5. the capability to acquire a second language through cognitive processing.

Colonising my Cognition

Genetics and the brain provides the blueprint for language acquisition and then the *serve and return social interaction* process is the major tool children use to gather linguistic data.[12] If a child is not provided with enough opportunity for this serve and return process, in other words, not enough social interaction in their first language, this can lead to poor formation of the brain's architecture and consequently lifelong learning and behavioural difficulties.[13]

Successful acquisition of a second language is a process that requires different and additional cognitive processes to those used to acquire the first language. Second language acquisition relies on a well developed first language. Second language acquisition places a cognitive strain on the learner as it relies on an existing well formed brain architecture, cognitive capacity, and conscious effort,

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[11] Wikipedia reference
[12] Harvard *Brain Architecture*
[13] ad ibid

once a child is past the critical acquisition period, which we now know is the first year of life.

The current process of educational instruction in English-only is failing first language speaking Indigenous children at several levels;

1. The critical period of syntactic acquisition between birth and 12 months of age has passed and children do not have available to them the ability to acquire English as a native, bi-lingual language. They commence school without the innate syntactic structures of English. The educational processes assume the child will acquire English through an intuitive process when in fact, that period of language acquisition capability is closed, and the child's brain is set up for serve and return social interaction in the first language. The child is therefore required to learn English through a cognitive process, which their brain is not ready to do.

The child's computer is not hard wired for English.

2. The children's prefrontal synthesis capabilities are hardwired for their first language. Continued first language acquisition through serve and return is needed in order for the higher order cognitive functioning to continue to develop.

The child's computer is hard wired for the first language and is waiting for software programs in that language, in order to work.

3. The brain lateralization period has closed and consequently the children's neuroplasticity is hard wired for their first language.

The child's computer is hard wired for the first language and there are no slots left to insert another drive.

4. The critical language acquisition period is closed and therefore the acquisition of English will be a cognitive process as for any second language learning. This process requires additional cognitive resources and is a strenuous process. The child is required to cognitively acquire English without the fully developed first language capabilities.

The child's computer is programmed in their first language and English software is very complex to install. Partial installation may be the result.

5. The acquisition of a second language requires the predisposition of a complete first language, prefrontal synthesis capabilities, and well developed metalinguistic and metacognitive abilities.

The child's computer is built and hard wired but now needs specific soft ware installed to ensure functionality.

The first language interruption, English-only instruction policy continues to colonise Indigenous children's cognition by removing, or at best vastly reducing, the chance the children will acquire a full phonemic, morphological, semantic, syntactic, sociolinguistic and discourse inventory in their first language. The policy reduces the opportunities for serve and return discourse, in increasing lexical and syntactic complexity, as required for continued prefrontal synthesis development The current educational instruction model is a formula for interrupted first language acquisition suggesting the perfect environment for reduced cognitive capacity.

The result of interrupted first language acquisition at such an early age is reduced prefrontal synthesis capabilities and reduce neuroplasticity. The metacognitive skills such as to mental script, self talk, plan, foresee, problem solve, question, inquire, reflect, be creative, imagine, strategize, comprehend, resolve conflict, respect others, adapt, listen, empathize, synthesize, self-assess, self-monitor, self-learn, self-regulate, self-question, to self actualize, are difficult to develop in the deficit linguistic environment. In effect, the capacity to be aware of, and in control of one's own mental processes and adaption capabilities.

Reduced first language capability, prefrontal synthesis capabilities and neuroplasticity, would by their nature, reduce the chance of second language acquisition.

School Language Programs

One of the solutions undertaken by the educational sectors is to provide a weekly language lesson for traditional language speakers. Indeed, Languages Other Than English (LOTE), is one of the compulsory teaching areas in schools.

The irony of disavowing First Nations children's linguistic rights and the ability to continue their linguistic and cognitive development in their cognitive language, and then to introduce the language as a school subject, is not lost on this author. The appropriation of Indigenous languages as school subjects controlled by the school, is the sickly sweet icing on the top of the metaphorical linguistic cake.

Decolonising First Nations' Children's Cognition

The solution to the problems created by the English-only educational policy is very simple; provide an educational environment that starts with the child's cognitive language and provides opportunity for the child to develop their full first language linguistic capability which will in turn optimize their cognition.

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