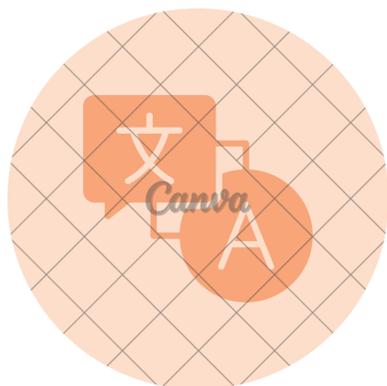


Bilingualism and Down syndrome: What an SLP Needs to Know



A collection of research
to guide clinical decision
making



Overview of Down syndrome

- Down syndrome is a naturally occurring chromosomal arrangement that is universal across gender, socioeconomic status, and ethnicity
- In Canada, one in 781 infants is born with Down syndrome

An Individual With Down syndrome May:

- Have Intellectual Disability
- Have delays in physical development, speech and language development, and motor development
- Characteristic physical features including short stature and a recognizable facial appearance

Types of Down syndrome and their Prevalence

- **Trisomy 21:** Accounts for 95% of the Down syndrome population. Occurs when there are three copies of chromosome 21 instead of two
- **Translocated:** Accounts for 3% of the Down syndrome population. Occurs when a part of chromosome 21 is present, but has attached or "trans-located" to another chromosome
- **Mosaic:** Accounts for 2% of the Down syndrome population. Occurs when an individual has some cells with two copies of chromosome 21, and other cells with three copies

Language Acquisition in Down syndrome

Language learning difficulties in children with Down syndrome (DS) are often greater than predicted based off their cognitive development. This gap between cognition and language production emerges fairly early during language development. This gap between comprehension and reception can be observed as early as during the emergence of the child's first few words.

Areas of Strength

- Receptive Language
- Vocabulary Acquisition
- Nonword Reading
- Word Reading Skills



Areas of Need

- Expressive Language
- Morphosyntax
- Intelligibility as a result of hypotonia, oral structure differences, and phonological delays
- Reading Comprehension



Myths About Bilingualism

Until recently, there was a lack of evidence on bilingualism and clinical practice for Speech-Language Pathologists

- Learning two languages at once does not confuse children; they can learn two languages at the same time. There is no research to support the need to keep the languages a child is learning separate
- It is typical for bilingual children to lag behind monolingual children regarding the rate of language acquisition. Learning two languages takes longer than learning one
- Bilingual children are typically stronger in one of their languages and can perform as well as monolingual speakers in their dominant language
- Bilingual children can have different strengths in each language they speak
- Parents should not be discouraged from speaking their native language to their children as this impacts the child's heritage and culture
- No bilingual environment is alike. They are all unique in the amount of support they provide for each language
- Quality not quantity: Children are more likely to acquire the language they hear more of, therefore it is important to ensure the child is receiving native-like exposure so they are getting the best model of language possible
- Total vocabulary is the best indicator of a bilingual child's language learning capacity as it examines their language knowledge in all languages

Down syndrome and Bilingualism

There is currently limited research on Down syndrome and bilingualism. This lack of research evidence impacts informed clinical decision making

Case Study Information

Case Study: FF

Vallar & Papagno, 1993

- Examined a 23 year old trilingual woman born with DS to Italian speaking parents
- FF's schooling was in Italian, but she learned English and French as a child
- FF's cognitive abilities in Italian (L1) demonstrated good acquisition of language and vocabulary despite wide-spread cognitive impairment
- Demonstrated a typical phonological short-term memory which researchers hypothesised is why she acquired vocabulary well
- Demonstrated virtually errorless learning in her L1 and performed well discriminating initial sounds
- For FF, exposure to more than one language did not restrict her L1 development. However, no conclusions can be drawn from her period of language acquisition as she was studied as an adult.



Case Study: MB

Burgoyne et al., 2016

- Examined a child whose L1 is Russian and L2 is English
- MB's oral language skills were slightly stronger in English as this was the language of formal instruction
- MB's cognitive abilities were significantly below typically developing (TD) peers. There were no significant differences in cognitive abilities between MB and monolingual children with DS
- Compared to TD English peers, MB performed significantly worse on measures of vocabulary, specifically receptive vocabulary
- MB's reading accuracy and fluency skills in her L2 consistency fell in the average range, that is, at the same level of her TD English peers
- MB's case study demonstrates that learning two languages in the presence of DS does not have a detrimental effect on literacy or language development.



Down syndrome and Bilingualism

Syntactic Bootstrapping in Down syndrome and bilingualism

4 groups of children matched on non-verbal mental age:

- 14 bilingual children with DS
- 12 monolingual children with DS
- 9 bilingual TD children
- 11 monolingual TD children

Participants participated in a computerised syntactic bootstrapping task using unfamiliar nouns and verbs. The syntactic cues employed *a* for the nouns and *ing* for the verbs.

There were no significant differences between the TD monolingual and TD bilingual group, or the DS-monolingual group and DS-bilingual group.

However, the DS monolingual group performed worse than the TD monolingual group, with a large effect size.

There is evidence that DS impacted performance, but no evidence that bilingualism negatively impacted the syntactic bootstrapping skills of the children with DS. Therefore, these results are consistent that parents should be supported in their decision to provide bilingual input to their children with DS

Cleave et al., 2014

Neuropsychological effects of second language exposure in Down Syndrome

Researchers were interested of the impact of second language exposure (SLE) on cognition in children with DS.

Children with second language exposure reported a daily average of four hours of exposure to their second language

Children with DS with SLE and monolingual children with DS were assessed using the Arizona Cognitive Test Battery.

Researchers found that SLE did not relate linearly to neuropsychological outcomes as in this sample, no measurable effects of SLE on neuropsychological functions were observed

Overall, this research provides evidence that SLE does not contribute detrimental effects on the cognitive profile of children with DS

Edgin et al., 2011

Down syndrome and Bilingualism

Language Learning in Four Bilingual Children with Down Syndrome: A Detailed Analysis of Vocabulary and Morphosyntax

The purpose of this research was to provide more information about the ability of children with DS to learn two languages.

The morphosyntactic and vocabulary skills in English and French of four bilingual children with DS were compared to that of a TD bilingual child and a monolingual child with DS.

The children were placed in triads that were matched on nonverbal mental age and exposure to a second language.

Compared to TD bilingual controls, children with DS were more likely to have lower MLU's, a higher use of bare nouns in expandable noun phrases, fewer overall verbs, fewer mastery of grammatical morphemes, fewer total words, fewer different words in their language sample, and lower index of productive syntax scores.

No consistent effects of bilingualism were observed as language delays were observed in both languages for bilingual children with DS, however all four of the bilingual children with DS were noted to be developing functional second language skills.

Feltmate & Kay Raining-Bird, 2008

The Language Abilities of Children with Down syndrome

The language abilities of bilingual children with DS were compared to three control groups: monolingual children with DS, monolingual TD children, and TD bilingual children. The bilingual children were determined to be either balanced bilingual or English-dominant and spoke English and one other language.

All participants had at minimum of 100 words in their productive vocabularies. Their mean length of utterance was less than 3.5.

Researchers used The Preschool Language Scale 3rd Edition (PLS-3), the MacArthur Communicative Development Inventories (CDI), and language sampling to assess English. Bilingual children were assessed in their second language using the CDI, language sampling, and a vocabulary comprehension test.

Findings suggest that similar language profiles exist for bilingual and monolingual children with DS

Kay Raining-Bird et al., 2005

Clinical Implications

Research findings suggest that bilingual children with DS can successfully learn and acquire two languages, and caregivers should not be discouraged from speaking more than one language to their child with DS. Bilingual children with DS can perform at least as well as monolingual children with DS in their dominant language.

From a cultural standpoint, it can be very isolating to recommend single language exposure for a child living in a multilingual environment. This recommendation may impact the child-caregiver natural interaction pattern if caregivers choose to speak a language they are not very comfortable speaking.

It is a speech-language pathologists job to provide adequate support in all languages a child speaks to ensure they acquire these languages to the best of their ability. Due to the limited research to guide clinical decisions, speech-language pathologists should assess and intervene as they would with any other child with a developmental disability: a thorough assessment of strengths and weaknesses, followed by intervention that is focused on areas of need, with increased functionality in the child's everyday environment. Volden, 2004



References

- Burgoyne, K., Duff, F. J., Nielsen, D., Ulicheva, A., & Snowling, M. J. (2016). Bilingualism and Biliteracy in Down Syndrome: Insights From a Case Study. *Language Learning*, 66(4), 945–971. <https://doi.org/10.1111/lang.12179>
- Canadian Down Syndrome Society. (n.d.). *About Down Syndrome*.
<https://cdss.ca/resources/general-information/>
- Cleave, P. L., Kay-Raining Bird, E., Trudeau, N., & Sutton, A. (2014). Syntactic bootstrapping in children with Down syndrome: The impact of bilingualism. *Journal of Communication Disorders*, 49, 42-54.
<https://doi.org/10.1016/j.jcomdis.2014.02.006>
- Edgin, J. O., Kumar, A., Spanò, G., & Nadel, L. (2011). Neuropsychological effects of second language exposure in Down syndrome. *Journal of Intellectual Disability Research*, 55(3), 351–356. <https://doi.org/10.1111/j.1365-2788.2010.01362.x>
- Feltmate, K., & Kay-Raining Bird, E. (2008). Language Learning in Four Bilingual Children with Down Syndrome: A Detailed Analysis of Vocabulary and Morphosyntax. *Canadian Journal of Speech-Language Pathology and Audiology*, 32(1), 6-20.
- Hoff, E., & Core, C. (2015). What Clinicians Need to Know about Bilingual Development. *Seminars in speech and language*, 36(2), 89–99.
<https://doi.org/10.1055/s-0035-1549104>
- Kay-Raining Bird, E., Cleave, P., Trudeau, N., Thordardottir, E., Sutton, A., & Thorpe, A. (2005). The Language Abilities of Bilingual Children With Down Syndrome. *American Journal of Speech-Language Pathology*, 14(3), 187–199.
[https://doi-org.proxy1.lib.uwo.ca/10.1044/1058-0360\(2005/019\)](https://doi-org.proxy1.lib.uwo.ca/10.1044/1058-0360(2005/019))
- Vallar, G., & Papagno, C. (1993). Preserved vocabulary acquisition in Down's syndrome: the role of phonological short-term memory. *Cortex: a journal devoted to the study of the nervous system and behavior*, 29(3), 467–483. [https://doi.org/10.1016/s0010-9452\(13\)80254-7](https://doi.org/10.1016/s0010-9452(13)80254-7)
- Volden, J. (2004). Nonverbal Learning Disability: A Tutorial for Speech-Language Pathologists. *American Journal of Speech-Language Pathology*, 13(2), 128-141.
[https://doi.org/10.1044/1058-0360\(2004/014\)](https://doi.org/10.1044/1058-0360(2004/014))