Bilingualism and Language Development in Children with Autism: Research Summary

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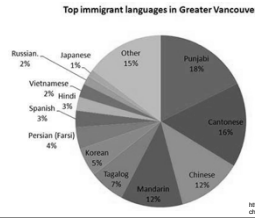
Bilingualism in Canada

- According to Statistics Canada (2012), 17.5% of individuals living in Canada speak more than one language regularly within the home
- In Metro Vancouver, 21% of people are in this group



http://www.cbc.ca/news/canada/british-columbia/punjabi-and-chinese-top-immigrant-languages-in-vancouver-1.1213824

Kay-Raining Bird et al. (2012)

- Surveyed 49 bilingual families with one or more children with ASD (ages 2-22) from Canada and five other countries
- 37 respondents (75%) reported that they were raising their child with ASD to be bilingual or multilingual
  - 61% reported two languages
  - 14% reported three languages

Parents' Experiences

Kay-Raining Bird et al. (2012)

- Of the 37 families who were raising their child with ASD bilingually, only three (8%) reported that they were consistently encouraged by professionals to raise their child with ASD bilingually
- Professional opposition to bilingual exposure came from
  - Physicians
  - Speech-language pathologists and psychologists
  - Social workers and teachers
- 89% of respondents reported that they had no access to professional help or services that supported bilingual language development
- BUT: parents reported that 46% of their bilingually-raised children with ASD had strong receptive and/or expressive language abilities in two languages, and another 22% were acquiring one language successfully

Parents' Voices: Three Studies

- Jegatheesan (2011): 3 mothers in families where English, Hindi, Arabic, and at least one additional South Asian language were spoken
- Fernandez y Garcia, Breslau, Hansen, & Miller, 2012: 5 mothers of 8 children with ASD; English + Mandarin, Portuguese, Hebrew, Spanish, Arabic
- Yu (2013): 10 mothers who were bilingual in Mandarin and English
- All lived in USA, had a child with ASD between 3-8
- Participated in detailed interviews in one of several languages

Importance of Learning English

- Shuan, in Yu (2013, p. 15):
  - *"I am mindful now to only speak English with him . . . Because the school he is going to now is an English-speaking environment, as well as the other settings he needs to be in. I think it's better to let him build a good foundation in English first."*
- Mr. Khan, in Jegatheesan (2011, p. 192):
  - *Once he steps outside of our home and our community, Jalil needs English. If something happens to him and he needs help, then who can help him if he cannot speak English?... Someday he might want to work when he is big. Who will hire him if he cannot speak English? Without English it's not possible to survive in America. We need to prepare him for his life here. He is never going back to Bangladesh. America is his home."*

Importance of Maintaining the Home Language

- Mother, in Fernandez y Garcia et al., (2012, p. 13:
  - *"[When I use my native language,] I feel that I am the children's mother now. My feelings are different, my mind is different. I feel like a mother."*
- Mrs. Yoosof, in Jegatheesan (2011, p. 193):
  - *"It's important for Raqib to be with his grandmother and aunts, uncles, and be able to talk to them. His grandmother, older aunts cannot speak English well…Raqib and his grandmother understand one another…. Even if it is a few words, he responds and it makes my mother-in-law happy. Being able to talk to one another has allowed them to have their own special relationship. Even if he combines few words, some sounds and gestures that is fine. At least he is trying to talk to his grandmother."*

Importance of Maintaining the Language of Religion

- All three mothers in Jegatheesen (2011) were Muslim. They explained that to be a Muslim was to learn to pray the daily ritual prayer in Arabic, and this was the highest goal they aspired for their children. The mothers took primary responsibility to teach their sons how to pray:
  - Mrs. Khan (p. 194): *"When he sleeps, I turn on a cassette tape from the beginning whatever he knows. He listens to that and then he falls asleep. We taped with his brother's voice all the Du'as [personal prayers] and all the Surahs [verses from the Qur'an] he knows… And then he listens everything. This will help his memorization of the words of the Qur'an. Otherwise, he will lose it."*
  - Mrs. Yoosof (p. 195): *"I make him sit next to me. And I say my prayers loud and he hears…I say mine three times a day and with him I do two times a day…When I say my prayers, I say one word at a time clearly, so that he can understand and he can hear, and also hear the pronunciation."*

Challenges with English Language Modeling

- Shaun, in Yu (2013, p. 19):
  - *"First, speaking English is not as easy as speaking Chinese. It's—it's not your first language…and…the time you spend thinking before you speak out is longer than Chinese…After work, you are tired, you want to relax…why should I speak in English?"*
- Mother, in Fernandez y Garcia et al., 2012, p. 13):
  - *"I stopped talking to [him] a lot, except to say "Be quiet' when [he] was too loud or something. I didn't know what words to use. You know, when you're cuddling them and all, I didn't know what to say."*
- Julie, in Yu (2013, p. 18):
  - *"How can they expect me to speak English with him? I failed at it. Then I thought if I could not help him in English, then I will do it in Chinese. That is how I felt. I also felt really inadequate. I couldn't help my son because my English was not good enough. So I felt bad."*
- Mrs. Latif, in Jegatheesen (2011, p. 192):
  - *"My English is not good, and when I speak I mix Urdu and have a strong accent. [So]…late at night we go to Wal-Mart and let him explore because there are not many people around at that time. And I teach him to speak English to the staff and the cashier."*

Reactions to Professional Advice

- Mother of three children with ASD, in Fernandez y Garcia et al (2012, p. 12):
  - *"The psychologists, the speech therapists – you know, everybody – they said that it would confuse them, to be consistent, and it would be better to use English because they would be using English in school. That we should pick one language."*
- Yeh-Ling, in Yu (2013, p. 18):
  - *"She [the professional] said that English was going to be of utmost importance to him because all of the language therapy and ABA sessions were going to be in English. . . . [She] recommended that we designate a certain room in the house to speak English. But I don't think that's very practical. It doesn't feel natural to us."*
- Mrs. Khan (in Jegatheesen, 2011, p.196):
  - *"He [her child] has grandparents, and they cannot speak English. So how our child can communicate with his grandmother if he knows only English? What they (professionals) are asking is unreasonable. So it is best we don't tell them anything. They don't need to know what we speak at home because it's a headache for us to make them understand. They just don't."*

Summary

- Professionals often advise parents to stop speaking their home language in favour of the majority language at home
- Parents often try to follow this advice, but there are many negative side effects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Early Language Development

Pathways in ASD Study

- Longitudinal study across five sites (BC, Alberta, Ontario, Quebec, and Nova Scotia)
- Funded since 2004
- Following 400 children and their families from the time of diagnosis (age 2-4:11) to (currently) high school graduation
- Multiple funders:

pathways in autism spectrum disorders

CIHR IRSC · NeuroDevNet · British Columbia · Alberta Innovates Health Solutions · Autism Speaks · Sinneave Family Foundation

+ Seung, Siddiqi, & Elder (2006)

- The only published report to date of early intervention delivered in two languages
- Documented the language development of a 3-year-old bilingual Korean-English boy with ASD over a 24-month period
  - For the first 6 months, the boy was provided with speech-language therapy in Korean only and made notable gains
  - After 12 months, English was gradually introduced into his therapy sessions
  - By 18 months, therapy was provided mainly in English
  - After 24 months of intervention, the child had made significant, measureable gains in English proficiency in both receptive and expressive language skills

+ Hambly & Fombonne (2012)

- Examined the early language milestones and vocabulary size of 75 children with ASD (ages 36-78 months, living in Quebec and Ontario)
  - Seven children (9%) spoke <10 words but only two of them were nonspeaking
  - Monolingual children (n=30) lived in homes where they were exposed to English, French, or Spanish only
  - Bilingual (n=34) and trilingual children (n=11) were exposed to both English and French OR to one of these plus a minority language
    - Some had simultaneous bi/trilingual exposure before 12 months of age (n=24)
    - Others had second language exposure added after 12 months of age (n=21)

+ Hambly & Fombonne (2012)

- Parents completed
  - A vocabulary checklist of words their children understood and said, in each language spoken at home
  - A language environment interview designed specifically for the study
  - A week-long language diary
- Results indicated that
  - Bi/trilingually-exposed children with ASD *did not* experience additional delays in language development compared to monolingual children
  - The timing of bi/trilingual exposure (before or after 12 months of age) did not affect outcomes in the children's dominant language abilities

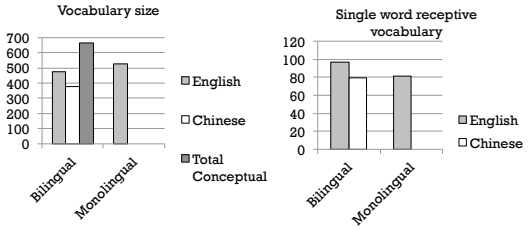
+ Petersen, Marinova-Todd, & Mirenda (2012)

- Examined language development of 14 Canadian bilingual Chinese-English children and 14 monolingual (English-speaking) children with ASD, matched by chronological age (43-73 months)
- All children spoke at least 30 words, by parent report

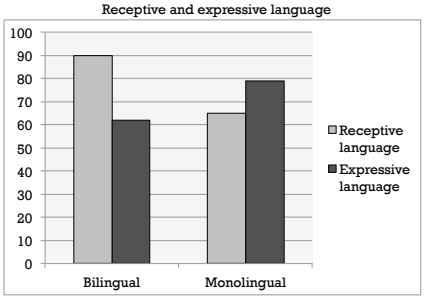
Petersen et al. (2012)

- Parents completed
  - A measure of language development (PLS-4) in English only
  - A vocabulary checklist of words the children understood and said, in English and (for bilingual children) Chinese
  - A measure of single word receptive vocabulary (PPVT) in English and (for bilingual children) Mandarin Chinese
- So, this study measured *conceptual vocabulary*, not just English vocabulary

RESULTS: *No significant difference* between groups on any measure although, in general, bilingual children had slightly higher scores



Petersen et al. (2012)



Ohashi, Mirenda, et al., 2012

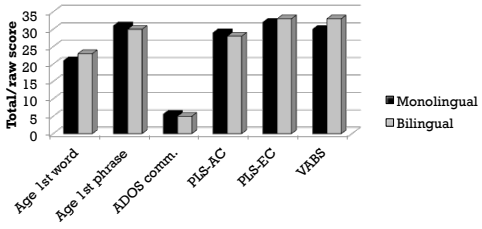
- Compared a group of Canadian bilingual-exposed children with ASD (n=20) aged 24-52 months and a matched group of monolingual-exposed children with ASD (n=40)
  - Matched by chronological age and nonverbal developmental age
- From birth-age 2, the bilingual children were exposed to either English or French and at least one other language at home
- All children spoke at least 30 words, by parent report

Ohashi et al., 2012

- Child measures included:
  - Age of first words (ADI-R)
  - Age of first phrases (ADI-R)
  - Autism communication score (ADOS)
  - Single word receptive vocabulary raw scores (PPVT)
  - Receptive language raw scores (PLS-4)
  - Expressive language raw scores (PLS-4)
  - Functional communication raw scores (VABS-II)

Ohashi et al. (2012)

RESULT: *No significant difference* between the two groups on any measure



Valicenti-McDermott et al. (2013)

- 40 monolingual (English) and 40 bilingual (English-Spanish) children with ASD, ages 20-32 mo
  - 20% of the monolingual children and 35% of the bilingual children were minimally verbal; otherwise, they were not significantly different on any of the study measures
- Cognitive ability (Bailey), autism severity (CARS), and early communicative means and receptive and expressive language were assessed (Rossetti)
- Again, there were no differences between the groups on any measure, except that bilingual children tended to vocalize and utilize gestures more often

Hambly & Fombonne, 2014

- Examined the relationship between second language vocabulary size and the amount the bilingual exposure in 33 bilingual children with ASD (ages 3-7 years) living in Quebec and Ontario
  - All children spoke 50 words in at least one language; 23 of the children also had some second language vocabulary

Hambly & Fombonne, 2014

- Child measures included:
  - Cognitive ability (categorized as average, mild delay, and moderate-severe delay)
  - Functional receptive and expressive communication (VABS-II)
  - Autism severity (SRS)
- Parents completed:
  - A vocabulary checklist of words their children understood and said, in each language spoken at home
  - A detailed language environment interview, by phone
  - A week-long language diary

Hambly & Fombonne, 2014

- Based on information from the interview and diary, a ratio was calculated to reflect the average proportion of 1:1 (caregiver:child) language exposure at home over the child's lifetime (e.g., 75% English, 25% Mandarin)
- Children were also grouped by the size of their second language (L2) vocabulary:
  - NO L2 vocabulary (10 children)
  - LOW L2 vocabulary (1-69 words; 11 children)
  - HIGH L2 vocabulary (70-559 words; 12 children)

Hambly & Fombonne, 2014

- "…all three cognitive groups – including those with moderate-severe impairments -- had children who were acquiring second language vocabularies" (p. 1086)
- Higher levels of both recent and lifetime L2 direct caregiver exposure contributed significantly to larger L2 vocabularies
- Children in the NO L2 and LOW L2 groups had "little to no direct caregiver communication in their L2 at the time of the study, although historically they had been spoken to in both languages. Many were from bilingual homes but were experiencing language loss or were treated as monolinguals within their bilingual family. If in childcare, they were either currently enrolled in monolingual childcare sites or addressed by adult caregivers in only their dominant language" (p. 1087)

In Other Words…

- If you want a child to speak the home language (L2), speak that language to the child
- *Passive exposure* (e.g., just listening to others speak the L2) is *not sufficient*
- *Don't assume* that children with cognitive delays will not be able to acquire an L2

Reetzke, Zou, Sheng, & Katsos, 2015

- Pragmatics: "The ability to use language appropriately in social contexts" (Tager-Flusberg, 1999)
  - In typically developing bilingual children, some studies suggest that there may be a bilingual *advantage* for pragmatic skills (e.g., Chen & Yan, 2011; Tare & Gelman, 2010)
- Question: Is there a difference in pragmatic skills between monolingual and bilingual children with ASD living in China?

Reetzke et al., 2015

- Two groups of Chinese children with ASD, ages 3-8 (mean = 5 years old)):
  - 31 monolingual-exposed (Mandarin, Cantonese, Yangjianghua, or Chaozhouhua)
  - 23 bilingual-exposed (Mandarin or Cantonese PLUS 30-40% exposure to an L2 from one of the other Chinese language families (Yue, Southern Min, Hainanese, Hakka, or Zian)
  - All children were able to speak
- Parents completed a language environment inventory and validated, translated versions of measures of structural and pragmatic language (CCC-2) and social communication (SRS)

Reetzke et al., 2015

- No significant difference between the two groups with regard to:
  - Structural language competence
  - Pragmatic language competence
  - Social communication skills

Howse, 2016

- First study to examine the relationship between early monolingual vs. bilingual exposure on speech development of children with ASD who spoke <5 words ("minimally verbal," MV) at the time of diagnosis (age 2-5)
- Question: Does early language exposure (monolingual vs. bilingual) predict these children's verbal status at age 6 (still MV or at least single words)?

Howse, 2016

- Involved 24 monolingual-exposed (ME, 96% English) and 10 bilingual-exposed (BE) children from Quebec, Ontario, Nova Scotia, and BC
  - By parent report, 70% of the BE children had at least 20% home exposure to one or more L2s from birth or age 1-age 6
  - The other 30% had similar exposure from age 2-age 6
- Verbal status at both diagnosis and age 6 were determined with a combination of information from the ADI-R and ADOS

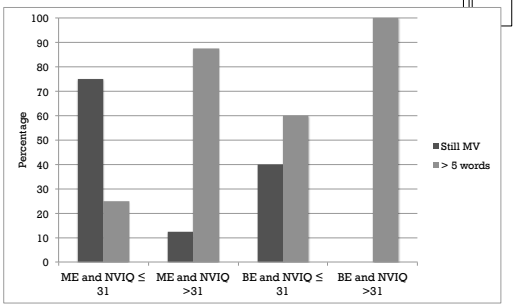
Howse, 2016

- Both ME and BE children were classified into two groups at age 6: still MV or >5 single words
- For each child, we examined home language exposure (ME vs BE), verbal status at age 6, and scores for
  - Nonverbal IQ (M-P-R Scales)
  - Responding to joint attention (ESCS)
  - Initiating joint attention (ESCS)
  - Imitation (motor and vocal; MIA)

Howse, 2016

- Home language exposure *did not predict* whether children who were MV at diagnosis would be speaking by age 6
  - In fact, in this sample, the odds of being MV at age 6 was five times greater for monolingual than for bilingual children
- The only measure that *did predict* age 6 verbal outcome was nonverbal IQ at the time of diagnosis (higher IQ = more likely to be verbal)

Howse, 2016



Summary: Early Language Development

- Results are quite consistent: early language development in children with ASD does not appear to be negatively impacted by bilingual home exposure
  - This seems to be true for children who are already speaking at the time of early diagnosis and those who are not, although more research is needed on the latter group
- Just like typically developing children, those with ASD are more likely to learn an L2 if their parents consistently speak to them in the L2

School-Age Children

Lam, 2015

- Remember the Reetzke et al. (2015) study from China?
  - Examined pragmatic language in young children with ASD (mean age = 5 years), using parent report measures (CCC-2 and SRS)
- Pragmatic language can also be assessed using narratives – stores that are told or re-told, based on pictures

Narrative Example 1

She got Toby on the weekend.

- No introduction: Who is "she"? Who is Toby?
- No details: Why did she "get" him? How does she feel about this?
- Shows little awareness of the need for social context

Narrative Example 2

My friend Lisa got a cat on the weekend. She named the cat Toby. She's so happy because she has wanted a cat for a long time.

- Now we know
  - Who Lisa and Toby are
  - How Lisa is feeling about getting Toby
  - Why she is feeling that way (causal)

Lam, 2015

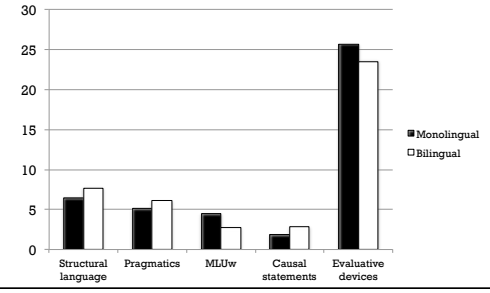
- Monolinguals (n = 22): Speak and understand only one language at age 8.5 – 9
  - No reports of exposure to another language since birth
- Bilinguals (n = 22): Speak and understand two languages at age 8.5 – 9
  - Exposed to two languages since age 5;11 or younger
- Matched on:
  - Age
  - Language ability (CELF-4)
  - Nonverbal IQ (WISC IV)
  - Autism severity (ADOS)

Lam, 2015

- Children's Communication Checklist – 2 (CCC-2, same as in Reetzke et al.)
  - 10 scales assessing different areas of communication, including pragmatics
- Expression, Reception, and Recall of Narrative Instrument (ERRNI; Bishop, 2006)
  - Child tells a story while looking at pictures, then answers comprehension questions
  - ERRNI was scored and narrative transcripts were coded

Lam, 2015

- *No significant differences* between monolingual and bilingual groups on any CCC-2 or ERRNI score



Lam, 2015

- Consistent with previous research focused on younger children with ASD
- No bilingual *advantage*; nonetheless, bilingualism does not seem to impede pragmatic skills, an important aspect of social language development in school-age children with ASD

Macaro, 2015

- Executive functions (EFs) are needed to complete any goal-oriented task or activity.
- EF deficits have been found in four EF areas in individuals with ASD (e.g., Bliijd-Hoogewys et al., 2014):
  - Cognitive flexibility: ability to switch between two perspectives or smoothly transition from one situation to another
  - Inhibition: ability to engage in self-control and suppress impulsive behaviour
  - Working memory: ability to hold and manipulate information in one's mind while completing a task
  - Planning: ability to generate and sequence thoughts and actions for a future-oriented task, and to monitor and update steps depending on the situation

EF in Typically Developing Children

- Some research suggests a bilingual *advantage* in TD children (Bialystok, Barac, Blaye, & Poulin-Dubois, 2010; Bialystok, Craik, & Luk, 2012; Bialystok & Viswanathan, 2008)
- Strong EF skills are fundamental to successful academic performance (Bialystok et al., 2012; Diamond, 2014)
  - EF is strongly linked to both math and reading achievement in TD monolingual children (e.g., Bull, Espy, & Wiebe, 2008; St. Clair-Thompson & Gathercole, 2006).

Macaro, 2016

- Monolinguals with ASD (n = 21): spoke and understood only English at age 8.5 – 9
  - No exposure to another language since birth
- Bilinguals with ASD (n = 21): Understood (but could not necessarily speak) two languages at age 8.5 – 9
  - Exposed to two languages at least 20% since birth
- Matched on:
  - Age
  - Language ability (CELF-4)
  - Nonverbal IQ (WISC IV)

Macaro, 2016

- Behaviour Rating Inventory of Executive Functions (BRIEF; Gioia et al., 2000) - parent report
  - inhibition (e.g., "blurts things out")
  - shift (e.g., "acts upset by a change in plans")
  - emotional control (e.g., "mood changes frequently")
  - initiation (e.g., "is not a self-starter")
  - working memory (e.g., "forgets what he/she was doing")
  - planning (e.g., "underestimates time needed to finish tasks")
  - organization of materials (e.g., "leaves a trail of belongings wherever he/she goes")
  - monitoring (e.g., "does not check work for mistakes").

Macaro, 2016

- Wechsler Individual Achievement Test- II Abbreviated (WIAT-II-A; Wechsler, 2001):
  - Word reading (including phonological awareness)
  - Numerical operations
  - Spelling

Macaro, 2016

- You know what I'm going to say, right?
- *No significant difference* on any subscale of the
  - Parent BRIEF
  - Teacher BRIEF
  - WIAT
- Bilingual group scored slightly, but nonsignificantly, higher on most of the subscales
  - Maybe a larger sample would reveal a bilingual advantage, but this study did not

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pathways in autism spectrum disorders

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