Psych 56L/ Ling 51: Acquisition of Language

Lecture 16
Childhood Bilingualism +
Language in Special Populations

Announcements

Reminder: Please complete the course evaluation for this class if you haven't already done so.

HW 3 is due today (returned Wednesday)

Wednesday is the review for the final - bring questions, your notes, and your book.

Review questions available for special populations

Final: Friday Dec 12, 1:30pm-3:30pm in SH 128 (same place as usual)

Childhood Bilingualism

Development Trajectory Data: Monolingual vs. Simultaneous Bilingual

Are bilingual children…

…the same as monolingual children, because acquiring language is fundamentally the same process?

…behind monolingual children, because there are two languages they have to decipher?

…ahead of monolingual children, because they have a more diverse linguistic experience and so are likely to learn more?

Development Trajectory Data: Monolingual vs. Simultaneous Bilingual

Precursors to language: canonical babbling

Both monolingual babies and bilingual babies begin canonical babbling at the same time.

Lexical development: vocabulary size & contents

Bilingual children tend to have smaller vocabularies in each of their languages than monolingual children do in their single language. However, lexical knowledge tends to be distributed in bilingual children - they know words in one language which they don't know in the other. Also, the total combined vocabulary tends to be larger than the total vocabulary of monolingual children.

Development Trajectory Data: Monolingual vs. Simultaneous Bilingual

Morphosyntactic development: Gathercole (2002) studies

Bilingual children lag behind monolingual children in mastering the grammar, even though the course of development is the same (go through similar stages).

Important note: input effects are apparent in bilingual acquisition

Frequency with which children hear the relevant structures in the target languages directly influences how well they acquire them. Bilingual exposure is, by necessity, less in each language than monolingual exposure.

Sequential Bilingualism: Language Trajectory

It's pretty rare that children "soak up language like a sponge", though it's true that children do better than adults in terms of ultimate attainment. However, they're likely to reach their ultimate knowledge state more slowly than adults (may take on average between 5-7 years).

Language transfer errors are common: errors caused by the influence of the old language on the new one


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Sequential Bilingualism: Language Trajectory

What happens to the child's first language varies - they may lose the first language altogether or they may have the first language become a non-dominant language (since the second language is the one they use more and are more proficient in).

What researchers agree on: these trade-offs between first and second language proficiency do *not* reflect the brain's capacity to handle two languages. Instead, they are a reflection of the psychology and sociology of language use.

Sequential Bilingualism: Research Questions

How similar is second language acquisition in childhood to first language acquisition? If children have specialized knowledge that helps them with first language acquisition (which goes away when they get older), is it still available for second language acquisition since their brains are still young?

Support for it being available: children's rate of first language development from 3-5 years of age was significantly related to their performance on tests of foreign language aptitude at 13 years of age (Skehan 1991)

Support for it not being available: very little variability in ultimate knowledge state for native language, but huge variability in ultimate knowledge state for second language

Sequential Bilingualism: Abilities that Help

One likely component of an aptitude for language that does not apply only to first language acquisition is phonological memory, the ability to repeat a new sound sequence after hearing it.

Children who are better at repeating a new sound sequence have been shown to be better at learning a new language (Service 1992, Service & Kohonen 1995).

Cognitive Consequences of Bilingualism

Is it better to learn multiple languages when you're young? Or is it better just to know one language?

Historical Perspectives

Yoshioka (1929), regarding immigrant bilingual children's performance on intelligence tests: "Bilingualism in young children is a hardship and devoid of apparent advantage."

Peal & Lambert (1962): bilinguals who are the same with respect to social class perform better than monolinguals on a variety of cognitive tasks. The bilingual child has "wider experience in two cultures", which has "given him advantages that a monolingual does not enjoy. Intellectually, his experience with two language systems seems to have left him with a mental flexibility, a superiority of concept formation, and a more diversified set of mental abilities…"

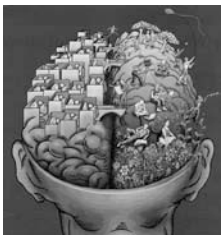
Historical Perspectives

Ben-Zeev (1977): Bilingual children are better at "seeking out the rules and for determining which are required by the circumstances."

Bialystok (1999), (2005), Bialystok & Majumder (1998): Bilingual children have an "attentional control" advantage. They do better than monolingual children at a task if distracting information is what makes it harder, but not if the central task itself is harder. This is true for both linguistic and nonlinguistic tasks.

Where are multiple languages in the brain?

Monolinguals usually have the left hemisphere specialized for language. What about bilinguals?



Where are multiple languages in the brain?

One idea: Bilingual representation is not the same as monolingual representation.

Evidence from brain damage: when bilingual speakers have brain damage, often one language is affected more than the other

Multilingual case 1: a native speaker of Swiss German who spoke fluent French, and some Italian and standard German. After a stroke, all languages suffered initially, but eventually recovered - except his native language, which was lost for good.

Where are multiple languages in the brain?

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Evidence from brain damage: when bilingual speakers have brain damage, often one language is affected more than the other

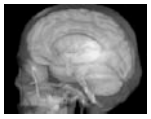
Multilingual case 2: a patient with a brain tumor suffered aphasia in her third and fourth-learned languages, but not her native and second-learned one.

Where are multiple languages in the brain?

One idea: Bilingual representation is not the same as monolingual representation.

However…these are atypical cases.

Typical pattern of recovery: both languages recover in parallel

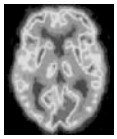


Where are multiple languages in the brain?

The other idea: Bilingual representation is the same as monolingual representation.

Experimental task evidence: give normal bilinguals tasks in both their languages and use brain-imaging techniques to see if the areas of the brain used depend on what language the task is in.

General results: many language tasks use the same areas of the brain, no matter what the language

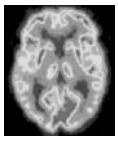


Where are multiple languages in the brain?

The other idea: Bilingual representation is the same as monolingual representation.

However…different regions of the brain may be recruited to do syntactic tasks, depending on age of acquisition.

General results: neurological underpinnings of syntax are different for languages acquired early vs later (while semantic underpinnings are not)



Bilingualism: Recap

There are two main divisions of childhood bilingualism, simultaneous bilingualism and sequential bilingualism. However, even within these divisions, the individual experience may vary significantly from bilingual to bilingual.

One of the main tasks a bilingual must accomplish is language differentiation. This tends to be accomplished early with respect to phonological development.

There is evidence supporting both sides of the argument concerning whether bilingualism is cognitively beneficial.

Special Populations

Why special populations?

Not everyone is a typically developing child.

From a research perspective, this is great - we can explore how different human abilities contribute to the human language acquisition process.

Does language develop differently if there's no auditory input (deaf children)?

What about if there's no visual input (blind children)?

What if general intelligence is lower (mentally retarded children)?

What if social abilities are lagging (autistic children)?

What about if only language abilities are lagging (specific language impairment children)?

Deaf Children

The situation

Focus on prelingually deaf children, who have not been exposed to spoken language and cannot (even with hearing aids) hear the spoken language around them.

Different ways for them to receive language input:

(1) Sign language (manual language), ~10% of deaf children, usually those who have a deaf parent (deaf-of-deaf children)

Impoverished language input:

(2) Oralist tradition: only the visible forms of spoken language

(3) Total communication: oral language combined with some kind of gestural system

About Sign Languages

Not just pantomime!

Sign languages are real languages - they have lexicons, morphology, and a grammar.

Go here for some examples of American Sign Language (ASL):

http://aslvlog.net/index.php?c=18

About Sign Languages

Some differences from spoken languages:

Some signs are iconic (TREE in American Sign Language (ASL) looks like a tree waving in the wind)

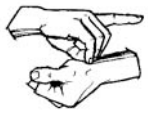
About Sign Languages

Some differences from spoken languages:

ASL uses pointing.

About Sign Languages

The point: learning sign language requires the same thing as learning a spoken language - figuring out the arbitrary mapping between form and meaning (lexicon, meaning), and how to combine elements together in order to form more complex meanings (words, sentences).



Progression of Sign Language Acquisition

Children pass through the same stages as in spoken language acquisition, in the same order: manual babbling to single-sign productions, to multisign combinations, followed by morphological development and more complex syntax.

Children make the same kind of mistakes as in spoken language acquisition, such as overregularization errors in morphology, ignoring parental corrections of form, pronoun reversal errors (confusing what "I" and "you" mean) - despite these being signified by pointing gestures.

Oral Language Development in Deaf Children

Before cochlear implants, the only input a deaf child learning an oral language has is the shape of the lips. This is hard! Several sounds share the same mouth shape.

Mouth "Elephant shoes" vs. "I love you."

Oral Language Development in Deaf Children

Phonological development: Deaf children differ during the babble stage from hearing children in both the quality and quantity of sound production. However, some orally trained children develop enough phonological awareness to identify rhymes from lip-reading.

Lexical development: oral vocabulary is delayed and proceeds more slowly.

Syntactic development: delayed, and endpoint of development falls far short of normal language competence.

John goes to fishing. Him wanted go. Who TV watched?
Who a boy gave you a ball? Tom has pushing the wagon.

Deaf Children: Recap

When children receive normal language input (such as sign language from a native sign language speaking parent), their linguistic develop is the same as that of children who acquire oral languages. Deaf children are not inherently handicapped with respect to language acquisition.

When children receive impoverished language input (such as only being able to lip-read), their development is delayed and, in some cases, they never reach full proficiency. This is what we might expect in any learning environment, not just oral language vs. manual languages.

Deaf Children: Recap

Implication 1: Language is a property of the human brain, not a property predicated on the mouth and ears.

Implication 2: Since deaf children make the same mistakes in learning as hearing children - despite sign languages being more naturally iconic - suggests that acquiring a formal grammatical system is a separate cognitive enterprise from learning how to communicate. If it wasn't, sign languages should be easier to pick up than spoken languages.

Blind Children

Why blind children?

Blind children can hear and talk. But their access to nonverbal communication and to the nonverbal context of communication is limited to what can be perceived through senses other than vision.

Ex 1: achieving joint attention through pointing and eye gaze isn't possible.

Ex 2: visual information about lip configurations for producing sounds isn't available.

Linguistic Development of Blind Children

Phonological development: Blind children make more errors than sighted children with sounds that involve visible articulatory movements (/b/, /m/, /f/).

Lexicon differences: Blind children have fewer words for things that can be seen, but not touched (like flag, moon). They have more words for things associated with auditory change.

Syntactic differences: Appears to be the about same as that of sighted children. Any differences between blind and sighted children's development can be traced to the nature of their mother's input. (Ex: auxiliary verbs (has, is) emerge later, and mothers provide fewer examples of these verbs since they often utter commands ("take the doll").)

Insight into first language acquisition

One perspective: language development builds on nonverbal communication, and on accessing the meanings of sentences from the observable nonlinguistic context.

But blind children can't do either of these - yet they still acquire language the same way (and at the same time) as sighted children do.

Implication: These are helpful aspects, but not necessary. Syntactic information in the language itself can be just as useful.

Mentally Retarded Children




A Heterogeneous Group

Mental retardation = "significantly subaverage general intellectual functioning…that is accompanied by significant limitations in adaptive functioning"

However…can help answer the question "Do you need to be smart in order to have language?"

Research import:

If language is the result of general cognitive abilities, mentally retarded individuals should have poor language.

If language is a specialized ability, it may be fine even if general intelligence is poor.

Down Syndrome

Chromosomal abnormality, accounts for about one third of the moderately to severely mentally retarded population.

While some Down syndrome individuals achieve typical adult-linguistic competence, most do not. Language tends to be more impaired than other cognitive functions. Grammar is particularly impaired.

However, communicative development and pragmatic development are strong. Down syndrome babies vocalize more and engage in mutual eye contact more. School-age children are particularly interested in social interaction and less interested in objects.

Down Syndrome Implications

Some language development (ex: grammar) is impaired. Therefore language development requires general cognitive abilities. (Any other ways to interpret this?)

Some language development (ex: communicative/social aspects) is not as impaired.

Therefore, "language" is not a single cognitive ability. Some of it requires general cognitive abilities, while some of it does not. (Any other ways to interpret this?)

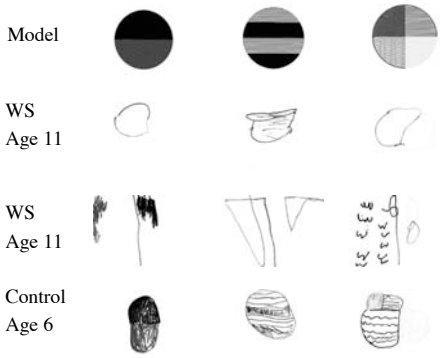
Williams Syndrome

Low general IQ (50-60), poor math, poor *visuospatial* reconstruction abilities

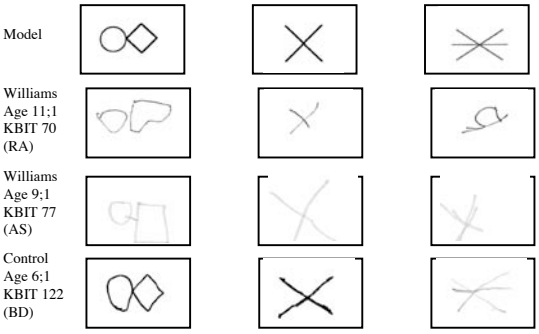
Good language, often good with music, highly social

Often used to make the argument for the dissociability of language and cognition.

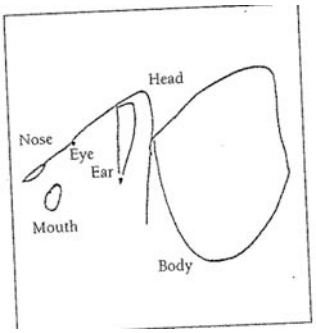
Williams Syndrome: Copying Simple Pictures



Williams Syndrome: Copying Simple Pictures



Williams Syndrome: "Draw An Elephant"



Williams Syndrome: "Describe An Elephant"

Williams Syndrome: "Describe An Elephant"

"And what an elephant is, it is one of the animals. And what the elephant does, it lives in the jungle. It can also live in the zoo. And what it has, it has long gray ears, fan ears, ears that can blow in the wind. It has a long trunk that can pick up grass, or pick up hay…If they're in a bad mood it can be terrible…If the elephant gets mad it could stomp; it could charge, like a bull can charge. They have long big tusks. They can damage a car…it could be dangerous. When they're in a pinch, when they're in a bad mood it can be terrible. You don't want an elephant as a pet. You want a cat or a dog or a bird…"

Describing Complex Pictures

"Bill is looking at the cow that the boy is pointing, and Max is looking at the cow that the girl is pointing at."
(WS, IQ approx. 40)

(Zukowski 2001)

Williams Syndrome: Conclusive?

While their language skills are quite impressive, in comparison to other cognitive abilities, they still lag behind those of typically developing children of the same chronological age.

Williams syndrome children show clear deficits on standardized tests of morphosyntactic knowledge.

Also, they seem to produce more than they comprehend (like Wernicke's aphasia patients). Often they can't answer questions about the stories they just told.

Williams Syndrome: Neurological Underpinnings

Williams syndrome brain is hypersensitive to processing faces and voices, and more of the brain is devoted to learning language.

So why does this lead to poorer performance in the end?

Karmiloff-Smith et al. (1997): Learning device is only driven to find patterns and extract rules (like grammar) when the space available is insufficient to memorize everything. So, Williams syndrome children have a lot of memorization space…and subsequently not enough (unconscious) motivation to find patterns and make a more compact system of representation.

Williams Syndrome: Implications

Excellent lexical development, phonological memory

+

Poor performance on grammar (and finding pattern regularities)

=

Williams syndrome children may acquire language differently than typically developing children. Process is not the same, end result is not the same. Therefore, not as decisive about the separation of typical language development from general intelligence.

Autistic Children

Characteristics of Autism

Always: impaired language and communication

Includes: impaired social development, delayed and deviant language, insistence on sameness, and onset before age 30 months

Variability: Distinction between lower- and higher-functioning individuals; linked to nonverbal cognitive abilities

Language in Lower-Functioning Autistics

Lower-functioning = ~80% of autistic individuals, scoring in mentally retarded range on nonverbal tests of development

~50% either do not speak at all or have echolalic speech,which is the meaningless repetition of a word or word group previously produced by another speaker

Some success in teaching lower-functioning individuals when speech is combined with manual signs.

Language in Higher-Functioning Autistics

Language success varies widely among higher-functioning autistics. In general, development is delayed and deviant in at least some respects.

Odd prosody: speech sounds mechanical (problems expressing emotional affect); possibly resulting from lack of attention to how others sound and/or a lack of interest in sounding like others

Gaps in semantics: autistic children do not use words that refer to mental states, such as *believe, guess, idea,* etc.; however, generally show similar understanding of other word meanings when compared with non-autistic children

Language in Higher-Functioning Autistics

Language success varies widely among higher-functioning autistics. In general, development is delayed and deviant in at least some respects.

Gaps in syntax: autistic children use a narrower range of constructions, generally do not ask questions; however, development generally follows a similar course to that of non-autistic children

Severe communicative competence impairment: infants show little interest in people and no preference for their mother's speech, rarely produce pointing gestures, joint attention skills markedly deficient, make pronoun reversal errors

Autism: Implications

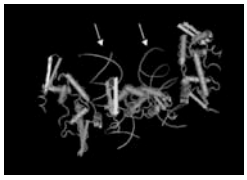
Impaired social abilities = impaired language, but crucially not the basic core of semantics and syntax

Idea: There is a dissociation between a computational mechanism used for acquiring grammar and the social/cognitive underpinnings of communicative development.

Idea: Basic deficit is lack of theory of mind, and understanding people's minds is a prerequisite to true communicative behavior.

However…lots of overlap with specific language impairment children, so underlying deficit may not be so simple as that. Lack of theory of mind could be result, not cause.

Specific Language Impairment



Characteristics of Specific Language Impairment (SLI)

Speech from a 16-year old with SLI:

He want play that violin.

Can I play with violin?

Then he went home and tell mother - his mother - tell what he doing that day.

Then about noontime those guy went in and eat and warm up.

Characteristics of Specific Language Impairment (SLI)

In the absence of any clear sensory or cognitive disorder, language development is impaired.

Generally, these children show late onset of talking as well. Vocabulary development is typically delayed, but the greatest deficits are in morphology and syntax.

However, SLI children produce different kinds of grammatical errors than typically developing children - so it may be that SLI children are actually acquiring language differently.

Characteristics of Specific Language Impairment (SLI)

Impaired phonological memory: SLI children are generally worse than typically developing children at repeating a meaningless sequence of sounds. (Remember, that was useful for predicting size of vocabulary in typically developing children.)

Nonlinguistic cognition impairment: worse at symbolic functioning, mental imagery, hierarchical planning, hypothesis testing, reasoning, drawing inferences from stories. Maybe SLI isn't so specific to language? (Though perhaps these are the result of a language deficit in some cases.)

Accounting for Specific Language Impairment (SLI)

Idea 1: SLI children have an impairment in the language acquisition device (generativist viewpoint). Specifically, their innate knowledge about language is missing a piece.

Ex: Unimpaired children hear *walk*, *walked*, *jump*, *jumped*, and build a rule for forming the past tense (+ed). Children with SLI never use those regularities to build a rule. They just memorize the different forms. (This is similar to one idea about how Williams syndrome children develop, with the difference being that Williams syndrome children have better associative memories for acoustic stimuli.) Crucial difference: even when they lack the memory capacity for all the grammatical forms, something is missing from SLI children that allows them to make a more compact representation like rules.

Accounting for Specific Language Impairment (SLI)

Idea 2: SLI children's phonological memory impairment means that they don't pick up on phonological information that is less salient, like unstressed grammatical morphology (Leonard 1989).

Ex: walk~walking, may be difficult for SLI children to retain in memory, and so they are delayed in picking up this information.

Note: doesn't necessarily account for all the differences between SLI and typically developing children.

Prediction: Should depend on the language - languages with more of this kind of less salient morphology should have more SLI kids. So far, sometimes yes, sometimes no.

Accounting for Specific Language Impairment (SLI)

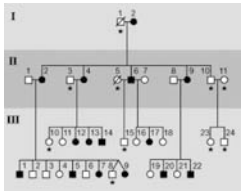
Idea 3: SLI children can't process rapidly processed stimuli, like speech, as well as typically developing children.

Ex: They can't process rapidly presented musical tones as well (Tallal 1978, Tallal et al. 1985), in addition to not being able to distinguish acoustic signals like dabiba vs. dabuba (Leonard et al. 1992).

This ties in with the impaired phonological memory story, since children with a processing deficit will definitely have more trouble with less salient phonological cues like most grammatical morphology.

Genetic Factors in Specific Language Impairment (SLI)

There seems to be a familial concentration of specific language impairment. In the KE family, it turned out to be a single dominant gene at work (the FOXP2 gene).



SLI: Implications

Since language development seems to depend on many different underlying abilities, language impairment will likely have a number of different underlying causes.

It also may be that SLI simply represents the low end of the spectrum of language acquisition (Leonard 1987, 1991). SLI children show the same variability seen in typically developing children: some are weak in syntax but strong in pragmatics, some have the opposite pattern, and some are weak in both. Potential Underlying problem: ability to extract regularities is significantly below average, which leads to many problems in language development.

Questions?