Effects of Age on Second Language Acquisition and Evidence of a Critical Period

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Second Language Acquisition

- Current paradigm
  - Structured, classroom lessons
  - Non-immersion
  - Wide range of starting ages
- But perhaps this should change

Critical Period Hypothesis

- Period of heightened language learning abilities
  - Exact underlying mechanisms are debated
- Quite evident for first language
- Role in second language acquisition debated

- Based on basic observation in language acquisition: younger is better

Critical Period Hypothesis: Key History

- “Ideal period” first hypothesized
  - Penfield & Roberts, 1959
- “Critical period” term coined and hypothesis popularized
  - Lenneberg, 1967
- Adults observed to pick up second language quicker early on, potentially suggesting a period limited to first language
  - Asher & Price, 1967; Collier, 1987; Snow & Hoefnagel-Höhle, 1978
- Research finds classification error rate ranging from 5% to 40% in existing research, potentially necessitating re-analysis of previous findings
  - Vanhove, 2020

Critical Period Explanations Over Time

- Brain not yet stiff and rigid; neural “switch” mechanism
  - Penfield & Roberts, 1959
- Integration of use and play allows children to learn better due to stimulating both hemispheres (learning settings)
  - Asher & Price, 1967; Asher & Garcia, 1969; Munoz, 2008
- Biological predisposition; imprinting theory, brain plasticity
  - Asher & Garcia, 1969; Birdsong, 2005a
- “Talented language learners”
  - Ioup, et al., 1994

Issues Plaguing Research

- Methodology
  - Pronunciation as measure of attainment
    - Inherently biased
    - Poor metric to measure comprehension
  - Metrics ‘replacing’ pronunciation often very similar or tied to pronunciation
  - Pronunciation and similar metrics used even in 21st century

Issues Plaguing Research *cont.*

- Monolingual Yardstick
  - Nativelikeness as the goal of second language acquisition
    - Unfair to hold bilinguals to same standards as native monolinguals
    - Not typically the goal of the learner
  - Bilingual ability should be measured against an ‘expert’ or ‘fluent’ bilingual
- Subjectivity
  - Recording of subjective metrics will be inherently biased against non-native speakers
  - Might justify re-analysis of much of the existing research to account for miss-rate

Psycholinguistic Perspective

- Adults and older children begin learning faster in formal instruction
  - Limited to first few months, after which younger children eclipse
- Critical period applicable to certain domains of language acquisition
  - Spontaneous performance, ability to recognize regional accents, knowledge of abstract syntactic structures
  - Mainly morphosyntax, grammar to a lesser extent
- Language learning setting and manner play key role in severity of critical period effects
  - Non-immersion (formal, instructed, classroom) vs immersion (informal, more passive, typically act/see what they say)

Psycholinguistic Perspective *cont.*

- Critical period timeframe dependent on language-learning setting
  - Immersion: Little to no decline until near teen years, age 10-12 typically
  - Non-immersion: Little to no decline until age nine
- Less dramatic but longer lasting decline in abilities than previously hypothesized
- Sharper decline beginning around age 17
  - End of ability for ultimate acquisition or native-like syntax

Neurological Perspective

- Critical period ending around 17 likely due to closure of a larger period of increased performance in behavioral domains
  - Development of supporting neural ‘hardware’
- Brain develops networks to support language, which become more solid [and as a result, lose elasticity] as we age
  - Networks must be stimulated early
  - Absence of a first language makes acquisition of first and subsequent language more difficult later on in life

Brain Differences

- PET, EEG, fMRI, and qMRI scans uncover neurological differences in learners across age ranges
- Early multilinguals process language homogenously across the brain
- Broca's and Wernicke's areas activated in different patterns
- Microstuctural variations in left inferior frontal region and left fusiform gyrus
- Early passive L2 exposure results in similar levels of variance as actively being raised bilingual

Neuropsychological Models

- Interactive Specialization Model
  - Specialized regions become more specialized and interconnected over time, thereby losing plasticity
- Neuroemergentism Model
  - Developmental change of specialized regions and networks is not isolated to one region or skill
- Interference Model
  - Second language acquisition ability restrained or stunted by continued use and development of first language

Observations

- Experience tutoring English to non-native speakers
  - Observed expected language acquisition observations
- Observed rapid language acquisition when multilingualism established from a young age
  - More integrated language processing network
- Greater difficulty reported with English since pandemic began
  - Less time outside home → less usage
- Comprehension improved drastically
  - Pronunciation ≠ Comprehension

Language Learning of the Future

- Research suggests we need change in the second language education paradigm
- Standardize a young starting age
  - Begin instruction within first few school years
    - Language foundation before age ten
- Promote immersion learning
  - Separate classroom where only target language is spoken/displayed
- Assessments based on use and comprehension, not repetition

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