PSYC 3640
Psychological Studies of Language
Alternative Language Processing
(Bilingualism and Sign Language)

November 13, 2007

Outline
• Research paper (due Nov 27 – last lecture)
• Last lecture
• Final Exam: Dec 5 (Wednesday) 2-5 p.m. YH B204 & B206
• Bilingualism
• Sign language
• Bimodal bilingualism (speech + sign)

Nature of Bilingualism
• Are you a bilingual?
• Affected by environmental factors: education system, immigration, social pressure, political environment…etc.
• Bilingualism is not categorical.

Types of Bilinguals
• Romaine (1995)
  Type 1: one person, one language
  Type 2: nondominant home language/one language, one environment
  Type 3: nondominant home language without community support
  Type 4: double nondominant home language without community support
  Type 5: nonnative parents
  Type 6: mixed languages

End Product of these Subtypes

Bilingual children growing up in different linguistic and social environment would differ in:

- (Relative) usage of language
  - Overcoming the urge to speak the stronger language
  - Finding a matching item in the weaker semantic network
- Proficiency of each language
  - Formal structures of language produced
  - Levels of comprehension in different contexts, e.g., speaking to grandparents on the phone vs. watching the news

Nature of Bilingualism

Linguistic Consequences of Bilingualism

- Delay in acquisition of speech sounds to word learning: Effect of two phonetic representations
- Concepts of print: Effect of two references to the same referent
- Limited transfer between languages: Effect of writing system
- Lower receptive vocabulary: Effect of two semantic network
- Lower performance in lexical retrieval: Effect of two semantic network

Speech Perception and Word Learning

- Fennell, Byers-Heinlein & Werker (2007)
  - Habituated to one syllable with an object
  - Switch to a different syllable with that same object
  - Monolingual infants showed dishabituation at 17 months, bilingual infants delayed to 20 months.
  - Results replicated in heterogeneous bilinguals and homogeneous bilinguals (Chinese-English & French-English)

Concepts of Print: Moving word task
(Apperly, Williams & Williams, 2004; Bialystok & Martin, 2003; Bialystok & Semman, 2004; Bialystok, Shenfield & Codd, 2000; Bialystok & Luk, 2007; Collins & Robinson, 2005)

Limited Transfer between Languages
• Depends on writing system → written representations of language
• Phonological awareness → Writing system effect is weaker (Luk & Bialystok, in press)
• Nonword decoding → writing system effect is greatest (Bialystok, Luk & Kwan, 2005)

Receptive Vocabulary
(Bialystok, 2007; Oller, Pearson & Cobo-Lewis, 2007)
• Canadian context (N = 963)

Word Retrieval
• Verbal fluency is an important screening measure for degenerative disease.
  Letter fluency: B = M
  Category fluency: B < M
  But we will come back to this findings later…
Cognitive Consequences of Bilingualism

• Cognitive flexibility
• Inhibitory control
• Selective attention

Executive Functions

Cognitive Flexibility
(Bialystok & Martin, 2004)

• Dimensional change card-sorting task (DCCS)

Inhibitory Control
(Bialystok & Senman, 2004; Bialystok & Sheparo, 2005)

Simon Task
(Bialystok, et al., 2004; Martin-Rhee & Bialystok, in press)
Simon Task across Lifespan

Bilingual mind

Handling two languages....

The verbal fluency task requires both executive functions and proficiency, we know:

(1) bilinguals are better at EF
(2) bilinguals are worse in proficiency
Is in VF really due to bilingualism?

- Young adults (119 bilinguals, 41 monolinguals)

![Graph showing letter category comparison between monolinguals and bilinguals.]

Partial results: Bialystok, Craik & Luk, in press

Bilingualism and the Brain
(Michelli et al., 2004)

- Grey matter density in inferior parietal lobe (BA 40) significantly correlate with proficiency in L2
- Italian-English bilinguals of all levels of proficiency
- Experience changes the anatomical brain structures

Summary for Bilingualism

- Bilingualism is a multidimensional construct that includes functional usage (how much) and proficiency (how well).
- The cognitive consequences of bilingualism is positive, but limited to nonverbal tasks.
- The linguistic consequences of bilingualism is mixed. Results can be influenced by:
  - Writing system
  - Phonetic representation
  - Semantic network
- Bilingualism also affects brain structure.

Sign Language

- Natural human language
- Different modalities compare to speech:
  - Speech: auditory in, verbal out
  - Sign: visual in, manual out
- Similarity:
  - Linguistic structures (“phonology”, syntax, word)
  - Diversity in languages (ASL, BSL, MSL, SSL...)
- Difference:
  - Sound → meaning vs. movement → meaning
  - Speech organ vs. bodily parts (arm, hand, facial expression, gesture)
  - No tense marker
Nicaraguan Sign Language Project

- Children began to sign to each other regardless of the oral approach in education.
- They were kept at home prior to the educational reform.
- Birth of a sign language purely based on usage.
- Language does not arise from one person or two people... you need a community.
- Home signs converge to give birth to a language system

First vs. Second generation of NSL
- Fluency: 2nd > 1st
- Efficiency: 2nd > 1st
- Complexity: 2nd > 1st

Development of NSL was driven by younger individuals than older ones → Critical period
- Process is similar to cerolization (how pidgin language evolves to a native-like language) in spoken language (the Hawaiian example)

Expression of ASL

- Fingerspelling
- Numbers and alphabets
- Noun
- Verb
- Adjective

Sign Language and the Brain
(Neville et al., 1998; Newman et al., 2002)
Bimodal Bilingualism

- Bimodal (speech-sign) bilinguals do not have the modality constraint as unimodal (speech-speech) bilinguals.
- Would the positive cognitive consequences of unimodal bilingualism extends to bimodal bilingualism?