A few terms...

- **Bilingualism**: any degree of proficiency in multiple languages
- **Native bilingualism**: acquisition of multiple languages as children
- **Second Language Acquisition/Learning**: learning a second language (L2) after already mastering a first language (L1)
Adult L2 Acquisition

- Learning a language after already acquiring a native language is different from learning two languages natively.
- Age of onset of acquisition makes a difference.
- True even for first language!
- L2 speakers who could otherwise pass as native will still have holes in their L2 knowledge that only come out under testing.
Quantifying language skill

- Interagency Language Roundtable (ILR)
- American Council for the Teaching of Foreign Languages (ACTFL)
<table>
<thead>
<tr>
<th>ILR Scale</th>
<th>Definition</th>
<th>ACTFL Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Able to speak like an educated native speaker</td>
<td>Native</td>
</tr>
<tr>
<td>4+</td>
<td>Able to speak with a great deal of fluency, grammatical accuracy, precision of vocabulary and idiomacity</td>
<td>Distinguished</td>
</tr>
<tr>
<td>4</td>
<td>Able to speak with a great deal of fluency, grammatical accuracy, precision of vocabulary and idiomacity</td>
<td></td>
</tr>
<tr>
<td>3+</td>
<td>Able to speak with structural accuracy &amp; vocabulary to participate well in most formal &amp; informal conversations</td>
<td>Superior</td>
</tr>
<tr>
<td>3</td>
<td>Able to speak with structural accuracy &amp; vocabulary to participate well in most formal &amp; informal conversations</td>
<td></td>
</tr>
<tr>
<td>2+</td>
<td>Satisfy most work requirements and show some ability to communicate on concrete topics</td>
<td>Advanced Plus</td>
</tr>
<tr>
<td>2</td>
<td>Satisfy routine social demands/limited work requirements</td>
<td>Advanced</td>
</tr>
<tr>
<td>1+</td>
<td>Satisfy most survival needs/limited social demands</td>
<td>Intermed. High</td>
</tr>
<tr>
<td>1</td>
<td>Satisfy most survival needs/limited social demands</td>
<td>Intermed. Mid</td>
</tr>
<tr>
<td></td>
<td>Some survival needs/some limited social demands</td>
<td>Intermed. Low</td>
</tr>
<tr>
<td>0+</td>
<td>Able to satisfy immediate needs with learned utterances</td>
<td>Novice - High</td>
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<td>Able to operate in only a very limited capacity Unable to function in spoken language/at all</td>
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Some questions

Psycholinguistic questions that have motivated L2 research:

• Do bilinguals experience interference between their two language systems?

• Is it possible to learn a second language as an adult and become a native-like speaker?

• How do multiple languages get organized in the brain?
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Language representation

L1

Distinct

L2
Language representation

L1

L2

Shared
Phonological representations

\[ /\ddot{\text{o}}/ \quad /t/ \quad /h/ \quad /p/ \quad /s/ \]

\[ /t/ \quad /p/ \quad /\beta/ \quad /G/ \]
Phonological representations

\[ /\ddot{\text{o}}/ \cap /\text{h}/ \cap /s/ \cap /t/ \cap /\beta/ \cap /\text{p}/ \cap /\text{G}/ \]
Lexical representations

dog table house

perro mesa casa
Syntactic representations
Some questions

Psycholinguistic questions that have motivated L2 research:

• Do bilinguals experience interference between their two language systems?
  • Phonological
  • Lexical
  • Syntactic

Evidence for both distinct and shared systems at all three levels
Phonological representations

Distinct

/t/  /δ/  /h/  /p/  /s/

/p/  /β/  /t/  /G/

Shared

/δ/  /p/  /β/  /t/  /G/  /s/  /h/
Shared phonology?

• Preparation Paradigm

• Faster to say list of words when they share initial phonetic segment

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Shared phonology?

- Preparation Paradigm
- Effect goes away if even single item does not have same initial segment

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**Shared phonology?**

- What about when words come from different languages?

- **Dutch/English Bilinguals (Dutch dominant)**

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<td>stoel</td>
</tr>
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Roelofs (2003)
Shared phonology?

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Shared phonology

- Results suggest that same sound is represented in the same system for both languages
- Phonological overlap between languages for shared sounds
Lexical representations?

Distinct

- dog
- table
- house

- perro
- mesa
- casa

Interaction

- dog
- house
- mesa
- casa
- table
- perro
Shared lexicons?

- Evidence from Picture-Word interference paradigm
- See picture plus word
- Ignore word
- Name picture
DOG

table

Unrelated
Control condition
Faster naming time than unrelated control. Word primes concept, which then helps name picture faster.
Faster naming time than unrelated control
Word primes concept, which then helps name picture faster
CHAIR

STROOP-LIKE EFFECT
“chair” competes with “table” lexically and conceptually
Slows naming time
STROOP-LIKE EFFECT
“chair” competes with “table” lexically and conceptually
Slows naming time
Distractors in other languages

• So, what happens when distractor word is the same word in another language
  • Same meaning?
  • Different meaning?

• Tested with Spanish-English bilinguals
  • (Costa & Caramazza, 1999)
mesa
Same Language

Matching Word

MESA

mesa
Same Language

SILLA

Semantically Related Word

mesa
Same Language

Semantically Unrelated Word
Difference Language

Matching Word

TABLE

mesa
Different Language

Semantically Related Word
Difference Language

Semantically Unrelated Word

CAR

mesa
Big question:
Will different-language, identical distractors act like competitors or identical words?

We assume that both words will activate same concept...
Big question:
Will different-language, identical distractors act like competitors or identical words?

Faster Naming Time:
Overlap in conceptual space
No lexical competition
Big question:
Will different-language, identical distractors act like *competitors* or identical words?

Slower Naming Time: Overlap and thus interaction between lexical representations
Results

Faster Naming Time:
Overlap in conceptual space
No lexical competition

Different Language

Same Language
Results

Separate Lexicons

dog  table  house

perro  mesa  casa
Syntactic representations

Distinct

Shared
No interaction?

• Syntax forms the core of any language
• least vulnerable to external influence
• least borrowed aspect between languages
Evidence for interaction

- Code switching/mixing
- Systematic lack of syntactic conflict:
  - I put the knives \textit{en la mesa}.
  - I put the knives on the table.
- Syntactic conflict extremely rare:
  - He ran to \textit{the house chiquita}.
  - He ran to the little house.
Syntactic priming revisited

- Hearing one kind of syntactic structure makes a speaker more likely to use that same structure
  - Active voice: Active voice
  - Passive voice: Passive voice
The boy swung the bat.

The lightning struck the church.

Syntactic Priming

Active ➔ Active
The bat was swung by the boy.

Passive

The church was struck by the lightning.

Passive

Syntactic Priming
Different structures

- Dative alternation
  - I gave the boy the book.
  - I gave the book to the boy.

- VERB NP NP
- VERB NP PP
The lawyer sent his client the contract.

The woman showed the man the dress.
The lawyer sent the contract to his client.

Syntactic Priming

The woman showed the dress to the man.
Hearing one kind of syntactic structure makes a speaker more likely to use that same structure.

Does this occur across languages in bilingual speakers?

Tested in German-English bilinguals (German dominant)

(Loebell & Bock, 2003)
The lawyer sent his client the contract.
The lawyer sent his client the contract.

Eine Frau zeigt einem Mann ein Kleid

VERB NP NP   \rightarrow   VERB NP NP
Der Rechtsanwalt schickte seinem Klienten den Vertrag.

A woman showed her client the dress.

Bilingual syntactic priming

Verbs NP NP → Verbs NP NP

Stronger than English → German
Bilingual structural priming

- Priming occurs between common structures in different languages
- Greater deviation between structure types weakens effect
- Strongest effect from dominant to non-dominant language
- Suggests: common structural representations or processes involved between languages
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L2 Learning

- L2 acquisition is usually incomplete compared to native bilingual or monolingual acquisition
- Rare people who excel at L2 acquisition
- Ordinarily:
  - Incomplete phonological acquisition
  - Incomplete (if subtle) syntactic acquisition
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The bilingual brain

- L1 and L2 occupy different areas of the brain
- Greater proficiency = greater overlap
- Multiple L1s occupy same areas
- L1 is more focal - concentrated into smaller area of the brain
- L2 is more distributed - spread out over larger portion of the brain