What Linguists Know About Language Attrition

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Outline of the lecture

- Basic notions
- Language attrition is not a uniform phenomenon
- ‘Attrition’ under impoverished input
Basic notions

- L1, L2 (temporal order of acquisition)
- L1 loss/attrition
  - Due to brain damage
  - Due to interference from another language
- Primary language—secondary language
- Communal language loss—individual language loss
- “Loss”/attrition (typically undefined)
The many faces of attrition
Types of attrition

- **Attrition: Loss of L1**
  - Contact induced change: the linguistic system of the language undergoing transfer does not have to turn into a simplified version of itself
  - Language decay: simplification of the linguistic system (paradigm leveling, register loss, overall loss of complexity in structure) and contraction of social contexts for language use
  - Forgetting
    No clear boundaries between the phenomena; contact induced change and decay are viewed as communal phenomena
Another type of ‘attrition’

- The acquisition of language $X$ is interrupted before that language is fully learned (incomplete or interrupted acquisition)
- Possible scenarios of interrupted acquisition (healthy subjects only)
Incomplete learners versus ‘forgetters’

- A possible diagnostic: Judgment task
  - He would have eaten—He would have ate
  - Susan likes herself—Susan likes her (binding context)

- Incomplete learners:
  - Chance performance on judgment tasks

- Forgetters:
  - High correct performance on judgment tasks (although lower than in controls)
Incomplete learners vs. ‘forgetters’

- Incomplete learners: differ from competent speakers of L in the mental representation of that language.

- ‘Forgetters’: differ from competent speakers of L in performance only.
Types of incomplete learners

- Overhearers: minimal exposure to L1, rapid switch to the dominant language
  - Interrupted at 4-5 years

- Intermediate incomplete learners: impeded production, limited comprehension (familiar topics only)
  - Interrupted at 7-9 years

- Advanced incomplete learners: reduced control of registers
  - Interrupted at 10-12 years
    - (Au & Romo 1997; Au et al. 2002)
Incomplete learners ~ Heritage speakers

- Terminological difference: psycholinguistics, L1 acquisition vs. sociolinguistics, L2 acquisition, language teaching

- Heritage language/incompletely learned language:
  - Culture-based definition: any language that a given group/individual has cultural, ethnic, or religious allegiance to (but does not have to have a speaking ability in) (Fishman 1981, 1992)
  - Language-based definition: a language that an individual grew up overhearing and/or speaking in the home (Valdés 2000)
What do incomplete learners sound like?

- incomplete Lithuanian (R), overhearer
  I was born here {=Chicago}# I moved # [California]# [San Francisco] # and then # my grandfather # my mother’s father# he had # [cancer]# and then# I went# I visit him# he does not speak English# I speak with him# I speak Lithuanian # he speak Lithuanian # many words# I don’t understand that #and then so it was# many times# I feel [soul]#I liked this# I decide# I learn Lithuanian# I go dance, I sing # and I can now I speak

(#: pause, ___ : code-switching)
What do incomplete learners sound like?

- incomplete Armenian, interrupted at age 8

  my house # where we lived in Erevan# it# there#
  the color # there it was dark# and# what-do-you-
  call-it # [stairwell] it was dark# dark everything # I
  dark# I don’t like it# you know #I think about the
  school # and then I see dark# it is all dark# I see
  that# I don’t like that # I don’t want# I go to
  Yerevan {capital of Armenia} and then# all dark
Incomplete acquisition:
Poverty of stimulus effects?
Main points for today

- The language of incomplete learners is not the same as the language spoken by the respective monolingual speakers.
- Incomplete acquisition shows a number of common features across languages.
- Understanding what incompletely acquired languages have in common and how they are different from full languages is an important step in developing efficient ways of teaching “heritage speakers.”
Linguistic issues in incomplete acquisition

- Do incomplete acquirers differ from full speakers in their linguistic competence (mental representation) or just in performance?
- If competence is different, does an incompletely acquired language constitute a constraint-based system or is it a collection of randomly acquired and retained “chunks”?
A system or a collection of “chunks”? 

**Predictions of the System Model**
- Speaker variation should be similar to/low than the variation found in full languages.
- Item frequency plays a subsidiary role, similar to the role played by frequency in complete acquisition.

**Predictions of the Chunks Model**
- Speaker variation should be more random than variation found in full languages.
- Item frequency plays a crucial role; the higher the frequency the more likely an item is to occur in the incompletely acquired language.
Variation under incomplete acquisition
Case study: Phonetics of Heritage Western Armenian (Godson 2001, 2002)

- Background
  Armenian: Indo-European, two main varieties, Eastern (Armenia, Iran) and Western ("Diaspora Armenian")
  Main dialects within Western Armenian: Turkish WA, Lebanese WA, Syrian WA, Egyptian WA
  Vowel system: 5 basic vowels (a, e, i, u, o); epenthetic schwa (ə), very frequent
Experimental setup

- Subjects: 10 incomplete acquirers of Western Armenian; 10 Armenian-English bilinguals (Armenian-dominant), 1 baseline monolingual Western Armenian speaker (all females)
- Procedure: Reading task
- Measurements: Spectral representation of vowels
How similar are two speakers?

- Compare vowel spectra
- Formal measure: Standard Deviation of the Differences Distribution, or SDDD index (Harmegnies 1988)

\[
SDDD = \left( \frac{1}{K} \sum_{i=1}^{K} (S_i - S'_i - M_d)^2 \right)^{0.5}
\]

- \( S \) and \( S' \) are the two spectra compared, each having an \( S_i \) and \( S'_i \) value for each of the \( K \) frequency components;
- \( M_d \) is the mean of the sum of the \( S_i - S'_i \) differences.

A standard deviation calculation on the differences between the set of amplitude measurements by frequency for the two spectra being compared. When the spectral shapes are widely different, the SDDD value increases; when the shapes are similar the SDDD decreases.
Positive control measurements

To test the suitability of the SDDD index for the data, an initial test was done with subjects known to have different articulatory settings:

- an English monolingual from the Midwest United States
- an English monolingual born and raised in Southern California
- an Armenian-dominant bilingual
SDDD range

- Midwest English monolingual vs. herself (2 speech samples): 2.77
- Midwest English monolingual vs. S. CA English monolingual: 6.12
- Midwest English monolingual vs. Armenian bilingual: 13.65
- S. CA English monolingual vs. Armenian bilingual: 13.13

The more different two dialects/languages, the higher the SDDD

0-3: same speaker
3-6: weak dialectal variation
6-9: strong dialectal variation
9+: different languages
## SDDD measures for Armenian speakers

### Armenian-dominant speakers by dialect

<table>
<thead>
<tr>
<th></th>
<th>Syria</th>
<th>Lebanon</th>
<th>Egypt</th>
<th>Jordan</th>
<th>Turkey</th>
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<tbody>
<tr>
<td>Syria</td>
<td>4.28</td>
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<td>3.64</td>
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<td>Jordan</td>
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<td>-</td>
<td>6.07</td>
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<tr>
<td>Turkey</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
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<td>N subjects</td>
<td>4</td>
<td>3</td>
<td>1</td>
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</table>

### Incomplete acquirers by parents’ dialect

<table>
<thead>
<tr>
<th></th>
<th>Syria</th>
<th>Lebanon</th>
<th>Egypt</th>
<th>Jordan</th>
<th>Turkey</th>
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<tbody>
<tr>
<td>Syria</td>
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<td>5.72</td>
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<td>Lebanon</td>
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<td>-</td>
<td></td>
<td>4.45</td>
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<td>Egypt</td>
<td>5.29</td>
<td>-</td>
<td>5.92</td>
<td></td>
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<td>Jordan</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>-</td>
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<tr>
<td>Turkey</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>4.03</td>
</tr>
<tr>
<td>N subjects</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>
Results

- Incomplete acquirers of Western Armenian show a smaller range of variation in phonetic setting than full speakers.
- This variation does not seem random.
Questions

- Is the limited range of variation in Heritage W. Armenian due to the development of a new “communal standard” shared by all the incomplete acquirers surveyed?
  - No, because the incomplete acquirers in the study come from different areas and backgrounds and generally do not speak Armenian/speak it on a very limited basis.

- Is the limited range of variation in Heritage W. Armenian due to the interference from English?
  - Further experiments were necessary to answer this question.
Vowel systems in Full Armenian, Heritage W. Armenian, and English

- There are perceptible differences in the pronunciation of incomplete acquirers and full speakers (the so-called ‘heritage accent’)
- The pronunciation of incomplete acquirers is judged as different from the pronunciation of L2 learners of Armenian
- Can the ‘heritage accent’ be reduced to the English accent?
- Godson 2002: study of vowel space in Full Western Armenian, Heritage Western Armenian, English
  - Choice of vowels: most perceptible, better measurements
  - Absent from the study: L2 learners of Armenian; incomplete acquirers whose dominant language is other than English
Vowel space: English, Heritage W. Armenian, and Full W. Armenian
Vowel space: English, Heritage W. Armenian, and Full W. Armenian (with schwa)
Conclusions for Heritage W. Armenian

- Subjective pronunciation differences between Heritage W. Armenian speakers and Armenian-dominant speakers are corroborated by phonetic measurements.
- The vowel system of Heritage W. Armenian cannot be accounted for by simple transfer from English.
- Overall results are more compatible with the constraint-based model because they reveal systematicity within each group of speakers.
How much do incompletely acquired languages resemble each other?

Structural similarities across incompletely acquired languages
Grammars of incompletely acquired languages

- The grammar of an individual heritage language is similar to the grammar of the baseline full language.

- Different heritage language grammars resemble each other more than each individual heritage language resembles the baseline.
Three test cases:

- Agreement
- Pro-drop (null/unexpressed subject)
- Aspect
Agreement under incomplete acquisition

- Impoverished morphology
  - Decline in agreement morphology
- Use of resumptive pronouns to compensate for the absence of agreement
  - The candle it burn
  - The candles it/they burn
Agreement and resumptive pronouns: Polish

- Subjects: 7 Heritage Polish speakers, mean age 27
- Procedure: spontaneous narrative and picture description
- Measurements: percentage of incorrect agreement forms; percentage of resumptive pronouns
Agreement and resumptive pronouns: Heritage Polish (Polinsky 1995)

Spearman rank correlation 0.855
Results: Agreement

- Incompletely acquired languages do not maintain the morphological agreement found in some full languages.
- The absence of agreement is gradient, not categorical.
- The absence of agreement is compensated for by the use of a resumptive pronoun.
Pro-drop (null subjects)

- Pro-drop: omission of non-emphatic subject pronouns, e.g. in Spanish:
  \( \emptyset \text{ compraron un vestido} \)
  ‘They bought a dress.’ [neutral statement]
  Ellas \text{ compraron un vestido}
  ‘THEY bought a dress.’ [contrast implied]

- Full languages with pro-drop: Spanish, Polish, Tamil, Japanese, etc.
Pro-drop under incomplete acquisition

Predictions:

- Absence of agreement > agreement based pro-drop is no longer sustainable

- Pro-drop is not a categorical feature in full languages, therefore, incompletely acquired languages should show decline, not loss, of pro-drop
Pro-drop in Full and Heritage Spanish

- Full Spanish: pro-drop occurring in 60%-80% utterances (Bentivoglio 1992; Ávila-Shah 2000; Toribio 2001; Montrul 2001)

- Heritage Spanish: pro-drop between 50%-70% (Silva-Corvalan 1994; Lipski 1993; Ávila-Shah 2000; Toribio 2001; Montrul 2001)
  - The level of proficiency of the heritage speakers in individual studies unclear; more data needed on both Full and Heritage Spanish, with emphasis on the dialectal baseline differences in full language
Pro-drop in Full and Heritage Polish

- Full Polish: Pro-drop at about 70% (statistics based on a narrative and a play)
- Heritage Polish: Pro-drop at 32.8%, averaged over 7 subjects
Heritage Polish: Pro-drop and agreement (Polinsky 1995)

Spearman rank correlation 0.855
Results: Pro-drop

- Minimal pro-drop in incompletely acquired languages
- The absence of pro-drop is gradient, not categorical
  - Rate of pro-drop may correlate with an individual speaker’s degree of proficiency
- Absence of pro-drop and absence of agreement are correlated
Aspect in Russian and Spanish

- Aspect: internal composition of a situation
  - Usual denotation: complete or incomplete (ongoing) event
  - Aspect is a particularly interesting phenomenon because the natural or inherent verb semantics combines with and modifies the interpretations of the grammatical ways of expressing aspect
- Tense: temporal relations between situations (such as past, present and future)
Inherent verb semantics: Vendler types

Basic aspectual verb types (Vendler 1967)

- **State**: eventuality in which there is no perceptible change (be boring, see, love)
- **Activity**: event without a goal, homogenous process (walk, snore, swim)
- **Achievement**: event with a goal but no duration, instantaneous (arrive, destroy)
- **Accomplishment**: event with a goal and duration (wash, tell)
Verb types and their expression

- Different Vendler types receive different grammatical expression across full languages (Van Valin & LaPolla 1997)
- How do incompletely acquired languages express different verb types?
  - Variation similar to what is found in full languages
  - Each verb type receives a similar expression across different incompletely acquired languages
Russian

- Deti kormili sobaku
  ‘The children were feeding (IMPF) the dog.’
- Deti nakormili sobaku
  ‘Children have fed (PERF) the dog.’
- Ja vse zabyvala
  ‘I kept forgetting (IMPF) everything.’
- Ja vse zabyla
  ‘I have forgotten (PERF) everything.’

Same tense, different aspectual forms, formally marked by prefixes/suffixes
All verb types participate in the alternation
Spanish

- Comíás bien en este restaurante ‘You ate (IMPF >Imperf) well in this restaurant.’ [generic]
- Comiste bien en este restaurante ‘You ate (PRET >Perf) well in this restaurant.’ [specific]
- El auto me costaba $20.000 ‘The car cost (IMPF>Imperf) me 20K.’
- El auto me costó $20.000 ‘The car cost (PRET>Perf) me 20K.’

Imperfect tense > imperfective aspect
Preterite tense > perfective aspect
All verb types participate in the alternation
Aspect in Full Russian and Full Spanish

- **Full Russian**
  - Imperfective/perfective: inflectional and derivational morphology of aspect and the case of the main argument
  - All event types are compatible with the imperfective and perfective aspect, with weak lexical preferences
  - Perfective has many sub-meanings and is more complex than imperfective

- **Full Spanish**
  - Imperfective/perfective: inflectional morphology of the Imperfect and Preterite tenses
  - All event types are compatible with Imperfect and Preterite, however, lexical preferences are found
  - Imperfective has many sub-meanings and is more complex than perfective
Aspect in Heritage Russian and Heritage Spanish

- Heritage Russian (Polinsky 1994, 2002)
  - Aspectual pairs are lost; typically, one aspectual form is maintained
  - States and activities (verbs denoting homogenous events): imperfective lexicalization
  - Achievements and accomplishments (verbs denoting goal-oriented events): perfective lexicalization

- Heritage Spanish (Montrul 2001; Slabakova & Montrul 2002)
  - Preterite and Imperfect are no longer possible with all verb types
  - States (verbs denoting homogenous events) avoid Preterite: imperfective preference
  - Achievements (verbs denoting goal-oriented events) avoid Imperfect: perfective preference
The mapping of event types into aspectual distinctions is lexicalized

- Multiple mappings are dispreferred (Heritage Spanish) or eliminated (Heritage Russian)

Aspect is reanalyzed to reflect the semantic distinction between goal-oriented (telic) events and events without a goal (atelic)

- Telic: accomplishments, achievements
- Atelic: states, activities
Choosing the verb form to keep

- Hypothesis:
  - Events that are more often represented as goal-oriented (telic) are expressed by perfective verbs
  - Events that are more often represented as non-goal-oriented (atelic), are expressed by imperfective verbs
  - Frequency of verb forms plays a role?
Frequency at work? Aspect lexicalization in Heritage Russian

<table>
<thead>
<tr>
<th>Event</th>
<th>Full Russian, IMPF freq.</th>
<th>Full Russian, PF freq.</th>
<th>American Russian form</th>
</tr>
</thead>
<tbody>
<tr>
<td>cry, scream</td>
<td>149</td>
<td>69</td>
<td>IMPF</td>
</tr>
<tr>
<td>live</td>
<td>716</td>
<td>21</td>
<td>IMPF</td>
</tr>
<tr>
<td>find</td>
<td>97</td>
<td>392</td>
<td>PF</td>
</tr>
<tr>
<td>die</td>
<td>45</td>
<td>165</td>
<td>PF</td>
</tr>
<tr>
<td>buy</td>
<td>63</td>
<td>153</td>
<td>PF</td>
</tr>
<tr>
<td>become</td>
<td>315</td>
<td>1583</td>
<td>PF</td>
</tr>
<tr>
<td>do</td>
<td>558</td>
<td>593</td>
<td>PF</td>
</tr>
<tr>
<td>fall down</td>
<td>130</td>
<td>116</td>
<td>PF</td>
</tr>
</tbody>
</table>
Results: Aspect

- Heritage Russian and Heritage Spanish show close parallels in the mapping of verb types into aspectual distinctions.
- The aspectual systems of Heritage Russian and Heritage Spanish differ from the aspectual systems of the respective full languages.
Results: Aspect

- How do incompletely acquired languages represent different verb types?
  - incompletely acquired languages are sensitive to verb type distinctions
  - each verb type receives a similar expression across different incompletely acquired languages (still tentative)
  - item frequency plays a mediating role
Other structural features (Polinsky 1995, 1997)

- Decline in case morphology
- Unmarked plural
- Unmarked possessive constructions: dog Tom
- No overt contrast between root and embedded clauses
- Coordination > subordination
- Restructuring of gender categories (Leisio 2000, Polinsky 2004) and classifier systems
Conclusions

- Structural similarities across incompletely acquired languages seem greater than structural similarities between a particular incompletely acquired language and its corresponding full language.
Grammars of incompletely acquired languages

- The grammar of an individual heritage language is similar to the grammar of the baseline full language.
- Different heritage language grammars resemble each other more than each individual heritage language resembles the baseline.
In search of explanation

- Why do different incompletely acquired languages manifest recurrent structural features that differentiate them from the baseline (the language used by competent speakers)?
Possible explanations for the recurrent structural properties in HL

- Absence of uninterpretable features (Sorace 2000, Montrul 2001)
  - Information that has nothing to do with the lexical item is lost/suppressed
- Shortest distance in dependencies
  - Processing effects proper
  - Grammaticization of processing effects
- Choice of the most unmarked way of speaking (Bickerton’s “bioprogram”)
Overall conclusions

- An incompletely acquired grammar differs from the grammar of a respective full language in a systematic, rather than random way.
- Incompletely acquired languages share a number of common structural features.
- At this point, there are several hypotheses as to how to account for the systematicity within and across incompletely acquired languages:
  - Rule- or constraint-based system
  - Patterns of preference
  - “Bioprogram”
Now what?

- Needed: More descriptive generalizations on the structure of incompletely acquired languages
  - These generalizations can be used to design further studies
  - These generalizations can be used to test what aspects of incompletely acquired languages are due to the interference from the dominant language
  - These generalizations can be used to inform pedagogical strategies in HL teaching
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