Bilingualism

The Role of Language in Therapy With the Spanish-English Bilingual Client – Azara L. Santiago-Rivera and Jeanette Altarriba

Bilingualism as a contributor to cognitive reserve: Evidence from brain atrophy in Alzheimer`s disease – Tom A. Schweizer, Jenna Ware, Corinne E. Fischer, Fergus I.M. Craik, Ellen Bialystok
Outline

- bilingualism in therapy
  - bilingualism as the norm
  - language storage
  - perspectives of therapy with bilinguals
  - assessment
  - future directions

- bilingualism and Alzheimer`s disease
  - cognitive reserve
  - experiment
  - results and open questions
Bilingualism in Therapy
Introduction

- culturally appropriate treatment

- language is the primary means of transmitting information about beliefs and cultural traditions

- main research in Spanish-English communities

- two broad areas of research
  - clinical evaluation of psychopathology
  - dynamics of language use in the treatment
Bilingualism as the Norm

- single domain bilinguals – bilingual speaker
- compound bilingual
  - only one representational meaning system
  - languages are learned simultaneously
- coordinate bilingual
  - two independent language systems
  - one language first, second language at some other point in time
  - degree of interdependence
how to assess language ability

- standardized tests
  - culturally biased
  - fail to capture implicit knowledge

- language history questionnaire
  - ability to speak, read, write
  - percentage of daily use

- alternatively assess actual performance on a task
How Languages Are Stored

- hard to say – MRI, PET scan
- model of language acquisition and storage (Kroll, Stewart)
  - word store – large for L1, smaller for L2
  - conceptual store – semantic information
  - words from L2 store are connected to words from L1 store
  - asymmetrical connections
  - subsequently connections from L2 store directly to conceptual one
Conceptual Development

- experiment by Altarriba and Mathis
- Stroop color-word task
  - congruent vs. incongruent trial
  - responses in English
- longer naming latencies after single learning session
Limitations of Model

- words with unique conceptual meaning
- concrete words vs. abstract words (emotion words)
- de Groot`s model
  - words with large overlap are interchangeable
  - language specific words
- language specific element relevant in therapy
Storage of Emotion Words

- discussing embarrassing topics
- Bond and Lai study
  - Chinese women interviewed in Cantonese and English
  - two neutral and two embarrassing topics
- emotion words in the first language have been experienced in many more contexts
- deliberate and predictable language switching
- importance of the ability to select the language in therapy
Perspectives in Therapy with Bilinguals

- Edith Bauxbaum – 1949
  - therapy with four German-English bilinguals
  - one woman chose to not speak English to control feelings
  - powerful memories were stored in German

- Ralph Greenson – 1950
  - role of both languages
  - Austrian German-English bilingual woman
  - sleep disturbance caused by conflicts associated with her mother
  - “In German I am a scared, dirty child; in English I am a nervous, refined woman.”
  - some sessions only in German
Eduardo Krapf – 1955
- for the first time described language switching to reduce anxiety
- it should be used as “a positive rather than a negative defense”
- did not elaborate on a strategic switching
Contemporary Views

- Language independence – Luis Marcos, Rafael Javier
  - Ability to acquire and maintain two separate language codes
  - Separate cognitive and emotional components
  - Memories are stored in language in which they occurred
  - It can lead to detachment

- Aragno and Schlachet – 1996
  - Memories are tied with language and stage of development
  - Word in the first language learned in childhood triggered vivid memories, but it had no significant impact in the second language
Language Switching in Therapy

- until 1970s no attempt to investigate the potential

- Pitta, Marcos, Alpert – 1978
  - Spanish-dominant female, English-dominant therapist
  - first sessions in Spanish to establish a relationship
  - later switch to English to distance herself from emotions
  - also used as defense mechanism
Assessment

- assessment should include both languages

- Del Castillo – 1970
  - clients showed greater pathology in the first language (Spanish) than in the second language (English)

- Marcos, Alpert, Urcuyo, Kesselman – 1973
  - opposite results

- conclusion – bilingualism affects the assessment
psychologist must distinguish between actual symptomatology and things which are associated with language use

Guttfreund – 1990
- Spanish-English coordinate bilinguals showed greater affect in the Spanish
- English-Spanish bilinguals also showed greater affect in the Spanish
- crucial is the language in which the experience is encoded
Future Directions

- take the advantage of bilingualism
  - maintenance of the second language has positive effects on well-being, understanding complex constructions, social sensitivity

- develop appropriate measure to assess language proficiency
  - modified language history questionnaire (Altarriba, 1992)
  - psycholinguistic History – incorporates developmental, psychosocial and cultural dimensions including the language of dreams, fantasies, internal dialogs… (Perez-Foster, 1998)

- conduct experimentally controlled studies to measure the effects of language switching on the therapy process and outcomes
Future Directions – cont.

- study of nonverbal behaviors
  - gestures, posturing and mannerisms can be language specific
  - how different would nonverbal behaviors be if the experience is told in other language

- solve the lack of psychologists adequately trained to work with bilingual clients
Bilingualism and Alzheimer's Disease
Onset of Alzheimer`s Disease

- 30% of individuals shows pathological criteria for AD at autopsy, but no signs of cognitive impairment during life
- what delays the onset of symptoms of AD
- brain reserve
  - features of the brain itself
  - greater brain size, increased number of neurons, larger pyramidal neurons
- cognitive reserve
Cognitive Reserve

- abstract term
- emphasizes functional rather than structural benefits
- intellectual, social and physical activities
- studies about delaying AD due to education, occupation, leisure activities
- what is the relation between brain and cognitive reserve
Bilingualism and Mental Functioning

- higher level of attentional control
- Bialystok et al. – 2007
  - delay of over 4 years in the onset of symptoms in the bilinguals
- findings were replicated in other studies
- how to investigate the relation between brain pathology and CR
  - match two groups with different levels of CR on degree of brain pathology
  - match two groups with different levels of CR on cognitive level
Design of Experiment

- 40 patients with a diagnosis of probable AD
- 20 monolinguals, 20 bilinguals
- matched on the BNA test of cognitive function
- similar number of years of education, gender mix, age

hypothesis
- bilingual group would show greater evidence of brain atrophy in the MTLs with little or no difference in measures of frontal or central atrophy
# Characteristics of Patients

**Table 1 – Demographic and behavioral characteristics of monolingual and bilingual patients.**

<table>
<thead>
<tr>
<th></th>
<th>Monolingual (n = 20)</th>
<th>Bilingual (n = 20)</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Age at CT scan</td>
<td>77.2</td>
<td>7</td>
<td>78.9</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>77.3(^a)</td>
<td>6.8</td>
<td>78.9</td>
</tr>
<tr>
<td>Education (years)</td>
<td>13.6</td>
<td>3.5</td>
<td>11.6</td>
</tr>
<tr>
<td>Occupational status</td>
<td>3.2(^b)</td>
<td>1.2</td>
<td>2.1(^b)</td>
</tr>
<tr>
<td>CDR</td>
<td>1.2</td>
<td>.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Katz ADL index (/6)</td>
<td>5.6</td>
<td>.8</td>
<td>5.6</td>
</tr>
<tr>
<td>Overall BNA (/114)</td>
<td>66.4</td>
<td>13.7</td>
<td>64.4(^a)</td>
</tr>
<tr>
<td>MMSE (/30)</td>
<td>23.2(^a)</td>
<td>3</td>
<td>22.1(^c)</td>
</tr>
<tr>
<td>Clock Drawing Test (/15)</td>
<td>10</td>
<td>4.2</td>
<td>10.3</td>
</tr>
</tbody>
</table>

\(a\) n = 19.

\(b\) n = 18.

\(c\) n = 17.
## Results

<table>
<thead>
<tr>
<th></th>
<th>Monolingual ((n = 20))</th>
<th>Bilingual ((n = 20))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Bicaudate ratio</td>
<td>.17</td>
<td>.03</td>
</tr>
<tr>
<td>Huckman’s number</td>
<td>60.01</td>
<td>7.82</td>
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<tr>
<td>Evans ratio</td>
<td>.36</td>
<td>.05</td>
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<tr>
<td>Suprasellar cistern ratio</td>
<td>.20</td>
<td>.02</td>
</tr>
<tr>
<td>Temporal horn ratio</td>
<td>.03***</td>
<td>.01</td>
</tr>
<tr>
<td>Third ventricle ratio</td>
<td>.06**</td>
<td>.02</td>
</tr>
<tr>
<td>Radial width of the temporal horn (rWTH) (^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>4.16***</td>
<td>1.09</td>
</tr>
<tr>
<td>Right</td>
<td>4.04*</td>
<td>1.56</td>
</tr>
<tr>
<td>Largest</td>
<td>4.69***</td>
<td>1.31</td>
</tr>
</tbody>
</table>

*\(p < .05\).
**\(p < .01\).
***\(p < .001\).
\(^a\) \(n = 19\)/group.
study showed that bilinguals exhibited greater amounts of brain atrophy in regions associated with disease pathology

differences between the groups in education and occupation work against the hypothesis

immigration issue
- 9 of 20 monolinguals and 16 of 20 bilinguals were immigrants
- delay in onset of AD is not affected by immigrant status – proved by Bialystok et al. (2007) and Craik et al. (2010)
Open Questions

- how does CR work
- does education, social, physical and intellectual activity modify some aspects of brain function
- does CR act like a highly practiced skill enabling the cognitive system to make more efficient use of impaired cerebral resources
- is there any difference between cognitive and brain reserve