Cross cultural neuropsychological assessment: Meeting the challenges

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GOAL

Improve the delivery of clinical neuropsychological services to ethnically diverse clients by increasing the awareness of specific historic, situational, methodological, and interpretive factors which could impact the assessment of racial/ethnic minority (REM) clients

What this lecture will not do

• Evaluate psychometric issues of construct and ecological validity, cultural equivalence, bias and differential item functioning  
• Answer all questions surrounding the assessment of REM clients  
• Offer specific dictates for clinical or forensic evaluations of REM clients
Preface: NP assessment with REMs

- Can be complex because cognition is a construct and assessment methods were created within a specific cultural context.
- Performance discrepancies between REM and non-Hispanic White neurologically normal adults are well-documented, span multiple cognitive domains, and are of a significant magnitude.
- Leads to many challenges in clinical settings with CNS compromise.
- Most NP graduate and postgraduate education does not offer adequate training to build confidence in practitioners.
- Can lead to assessment anxieties for the examiner.
- In reality, most clinicians have some fears about whether they are conducting the best possible evaluation of minority clients.
- Empirical studies have not kept pace with clinical demands of the field.

Guiding questions: Cross-cultural neuropsychology (CCNP) assessment challenges

- Why is diversity accompanied by challenges?
- What are the primary diversity challenges?
- How can we meet these challenges in our practice?
- How can we contribute to eradicating diversity challenges?

Culturally responsive assessment: An unavoidable future for neuropsychology

- We must be responsive to the rapidly changing nature of the populations we serve.
- An issue of professional competence:
  - Neuropsychologists are ethically obligated to provide valid assessments to all clients.
- AACN Relevance 2050 committee.
APA Ethics Code

Principle B: Fidelity and Responsibility
- Psychologists are aware of their professional and scientific responsibilities to society and to the specific communities in which they work.
- Psychologists consult with, refer to, or cooperate with other professionals and institutions to the extent needed to serve the best interests of those with whom they serve.

Principle D: Justice
- Psychologists recognize that fairness and justice entitle all persons to access to and benefit from the contributions of psychology and to equal quality in the processes, procedures and services...
- Psychologists exercise reasonable judgment and take precautions to ensure that their potential biases, the boundaries of their competence and the limitations of their expertise do not lead to or condone unjust practices.

Why focus on REMs?
- Most of what we know about cross-cultural NP assessment emerges from American REMs
- REMs likely to comprise sizable proportion of cross-cultural referrals
- General practice principles developed with REMs can apply to immigrant groups
INCREASING DIVERSITY
Percent of the Population, by Race and Hispanic Origin: 1990 - 2050

White, not Hispanic
Black
Asian and Pacific Islander
American Indian, Eskimo and Aleut
Hispanic origin (of any race)

Source: U.S. Bureau of the Census, decennial census and population projections

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Why not:
“The Neuropsychology of xx (specific REM) group”

- More effective to address general principles
- Heterogeneity within ethnic groups is broad
  - Example: Asian-Americans
    - 14.7 million Asian-Americans (4.8% of U.S. population)
    - 15.3% of Asian-Americans report more than one race
    - 2010 Census lists 24 single Asian ethnicities:
      1. Chinese
      2. Asian Indians
      3. Filipinos
      4. Vietnamese
      5. Korean
      6. Japanese
      7. Pakistani
      8. Hmong
      9. Laotian
      10. Thai

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International considerations

- Clinical needs of populations impacted by CNS relevant disease pushing the global CCNP agenda
  - Increased research interest from Western neuropsychologists
  - Top down approach
    - Apply Western tests and methods
    - Unlimited opportunities to develop/explore theories, psychometric properties and testing assumptions of Western style neuropsychology
  - Major practice limits in resource limited countries
Guiding questions:
Cross-cultural neuropsychology (CCNP) assessment challenges

- Why is diversity accompanied by challenges?
- What are the primary diversity challenges?
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- How can we contribute to eradicating diversity challenges?
Culture, ethnicity, and race:
Clarification of terms

“All individuals are cultural beings who possess a cultural, racial, and ethnic heritage”


Culture
• The integrated pattern of human knowledge, beliefs, and behavior, that depends upon the capacity for learning and transmitting knowledge to succeeding generations
• All those things that people have learned to do, believe, value, and enjoy in their history. It is the totality of ideals, beliefs, skills, tools, customs, and institutions into which members of a society is born.

(Sue and Sue, 1990)
Culture

- Culture determines the ways in which individuals:
  - experience their social environment,
  - set priorities,
  - behave in different kinds of situations,
  - understand cause and effect relationships.

- Culture guides how a person views the world:
  - interpretations of perception and prioritization of attention resources

- Culture can impact all aspects of physical/mental health & health care

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Culture

- Most of us belong to multiple cultural groups as determined by characteristics as varied as:
  - Geographic region of origin or residence
  - Gender
  - Profession
  - Sexual orientation
  - Hobbies
  - Ethnic identification
  - Nationality
  - Disability status
  - Religion
  - Sports

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Cross cultural neuropsychological assessment

- A clinical or research encounter is cross-cultural when there are significant cultural or language differences between the examiner, examinee, informants, tests, and/or social context. (Judd et al., 2009)
“Race”

- Historically conceptualized according to biology
  - Lacks precise meaning
- Of the 15,000 to 20,000 gene pairs identified, only 6 have been found to be related to race (Helms, 2005)
- Genetic variance within a racial group often greater than between-group variance
- Reality: Race is a social-political construct
  - Arbitrary, contrived social divisions for political, economic and anthropological categorization (Gould, 1981; Helms, 2005)

Origins of racial classifications
Demonstrative video series

Ethnicity

- Groupings among people based on shared cultural characteristics
- Independent of race but often used interchangeably
  - Exceptions: adopted children whose race differs from parents but ethnicity is shared
- Per U.S. Census, there are only two ethnic distinctions in USA:
  - Hispanic/Latino and Non-Hispanic
American Racial/Ethnic Minorities

- African Americans
- Hispanics/Latinos
- Asians/Asian Americans
- Native Hawaiians and other Pacific Islanders, Native Americans and Alaska Natives
- In other countries, ethnic minority status may be determined by language, religion or citizenship status

Race and ethnicity: Labels

- Names & definitions of racial/ethnic groups in the US are fluid
- Ethnic minorities contest labels & rename themselves as part of ongoing political struggle.
- What "race" a person is in the US has enormous social, economic, and political consequences that will affect them whether they ascribe to the construct or not.
  - Due to the history of colonialism and race-based chattel slavery, racial groups exist on a hierarchy. Thus, constant status issues surround racial identification

Cultural Neuropsychology: Premise

- Cognition is a construct
  - By default is interpreted and measured through a cultural lens challenging the age-old assumption that culture doesn't matter in cognitive assessment.
- NP test scores imperfect index of brain functioning
  - Cultural orientation is but one potentially confounding factor
- Historic intersection between NP and racist ideology
- Performance differences among ethnic minorities in the US:
  - Significant, multifaceted and because of historic political context, difficult to address
- We consider culture in this context
Cross cultural neuropsychology: Layers of complexity

- Level of the tests
  - Psychometrics
  - Normative data set selection
  - Cultural Equivalence (Helms, 1992)

- Level of the examinees
  - Behavioral factors that impact performance
    - Orientation to speed on timed tests, response style on narrative memory tests
  - Non-English speaking
  - Unique processing mechanisms; neural networks

- Level of the examiner
  - Change: tests/items, testing language, normative standards, interpretation

History of Psychological Testing

- Origins of psychological testing rooted in child assessment
- Cross-cultural application soon followed the development of “objective” measures of cognitive ability
- Historic intersection of NP and racist ideology
  - Erroneous interpretations of test score differences between racial groups
Anthropology's Influence

- From 1830 - early 1900s, anthropologists aimed to use "science" to justify colonialism and racism
- Early 1900s - Franz Boas questioned ethnocentrism of existing theories of mind
- Some psychologists borrowed these ideas to address assumptions built into intelligence tests

History: IQ testing

- First IQ tests developed by Alfred Binet & Theodore Simon
  - In 1904, Binet was commissioned by the French Ministry of Public Instruction to develop techniques for identifying primary grade children whose lack of success in normal classrooms suggested the need for some form of special education
  - 1905, 1st intelligence scale; 30 items of increasing difficulty
  - Revised 1908, age specific versions
  - These were developed to identify children who required 'special' education

Binet's intention for IQ tests

- Test scores are indicators only
  - No supposition of etiology of low scores
- IQ scale is a rough guide to identify challenged children
- Tests should not be used to rank normally performing children
- Low scores should result in special education interventions; not interpreted as an innate marker
Psychological Measurement in the 20th Century

- Growth of public education and availability of limited funds: testing could assist in resource allocation
- Simultaneous needs of the military to determine cognitive ability for allocating personnel (WWI)
- Cognitive tests applied to evaluation of European immigrants to the US to determine "fitness" level
- Tests widely applied to the exploration of "race" differences

Henry H. Goddard (1866-1957)

- American psychologist
- Hired by the Vineland Training School to determine the genetic causes of "feeble-mindedness"
- Major Contributions
  - Translated the Binet-Simon intelligence scale into English (1908)
  - Distributed 22,000 copies of the translated Binet scale and 88,000 answer blanks across the United States (1908-1915)
  - Established the first laboratory for the psychological study of mentally retarded persons (1910)
  - Helped to draft the first American law mandating special education (1911)
- Considered a pioneer of the American eugenics movement.

Henry H. Goddard

- Influenced by Mendelian genetics; believed that "feeble-mindedness" was the result of a single recessive gene.
- Interpreted data from racial cognitive difference studies as proof of genetic/biological inferiority of immigrants and African Americans
Consequences of Goddard’s work

- The height of Goddard’s success came at a time when America was experiencing a large influx of immigrants from Europe. The Immigration Restriction Act, passed in 1924 (which remained in effect until 1965) was influenced by American eugenicists’ efforts.
- In 1913 Goddard was invited to Ellis Island to help detect “morons” in the immigrant population. In resulting texts, he asserted that most of the Ellis Island immigrants were mentally deficient. 
  - 82% of the Hungarians, 83% of the Jews, 79% of the Italians, and 87% of the Russians tested were “feeble-minded.”
- Result: many immigrants were denied entry to US and ordered to return to Europe because of test scores.
- Deportations for mental deficiency increased 570% in 1914 over the preceding five years.

History of Testing: Post Goddard

- Explosion of assessment research using intelligence tests
- IQ tests used to scientifically justify discriminatory practices, existing racial hierarchies and taxonomic classifications
- Some earlier studies of differences found REM children to earn higher scores (Stetson, 1897); these discounted as not relevant

Lewis Terman (1877-1956)

- Stanford University; adapted Binet’s test for California school children
  - Found that the Paris-based age norms were not applicable in U.S.
- Revised the test: adapted and added items, established new age norms, and extended the upper age limit to “superior adults”
  - Contained first use of intelligence quotient.
Terman's assertion

- The Binet scale is a true test of native intelligence, relatively free of the disturbing influences of nurture and background
  - Terman (1916)

Terman: Impact

"High-grade or border-line deficiency... is very, very common among Spanish-Indian and Mexican families of the Southwest and also among negroes. Their dullness seems to be racial, or at least inherent in the family stocks from which they come...

Children of this group should be segregated into separate classes...

They cannot master abstractions but they can often be made into efficient workers... the whole question of racial differences in mental traits will have to be taken up anew and by experimental methods... from a eugenic point of view they constitute a grave problem because of their unusually prolific breeding."


Race Differences

(Otto Klineberg, 1935)

- Canadian social psychologist who debunked myths of intelligence and racial inferiority
- Environmental factors cannot be ignored in any valid interpretation of results on race and IQ
  - Motivation
    - Groups should be equally interested in the tests and competing with equal eagerness for best results
  - Rapport with examiner
  - Culture
    - Attitude towards speed
    - Language
    - Social and economic status
    - Schooling
History of psychological testing: relevance to CCNP

- Psychological assessment in the US, as a science, developed in the historical context of overt, institutionalized racism and the desire to establish the genetic inferiority of certain groups of people to justify these practices.

Neuropsychology’s “uncomfortable” history: Responsible responses

- Transparency
  - Include content in curriculum, licensing exams
  - Be open about the racist orientation of many of the scientists and society at the time
  - Encourage discussions about it
  - Critique the historic body of work for flaws and fresh interpretations

- Recognize how it influences current assumptions & assessment practices
  - Respect the hesitancy of some groups to participate in/trust the assessment process.
Factors that can influence cognitive test performance

- Education level
- Prenatal health
- Gender
- Psychoactive Drugs
- Neurological Disease/Injury
- Age
- Medical conditions
- Culture

How does culture influence cognition?

- Acculturation
- Education quality
- Cognitive processing styles
- Racial socialization/Stereotype threat
- Orientation to time
- Prior experience with stimuli
- Unknowns

Mediating factors

- Culture
- Cognition
Cultural values in psychometric testing (Ardila, 2005)

- Relevance of behavior
- Expectations for testing situations
- Orientation to providing “best” performance
  - Testing motivation
- Interpreting questions that have “obvious” answers
  - WAIS similarities subtests

The problem of low specificity of neuropsychological measures

- Significant ethnic differences occur across many cognitive domains
- Several studies show reduced specificity of cognitive measures among African Americans and Hispanics
- Reduced specificity may result in increased misdiagnosis of cognitive impairment

Cultural effects on test performance:

- WAIS-III Full Scale IQ:
  - Education is not the great equalizer
  - Heaton & Taylor, 2001
Consequences of Misunderstanding the Impact of Culture on testing

- Misdiagnoses
  - Restriction of privileges
  - Improper vocational and educational placements
  - Invalid legal testimony
  - “Return to play” status of sport players
- Misrepresentation
  - Scientific literature
  - General population

Lessons from the debates over the source of “racial” differences on cognitive tests

- Unexplained ethnic group differences leave a void for racist interpretation
- Psychologists must be wary of science that merely reflects and justifies current social prejudices
- It is unethical to ignore possible misinterpretations of cognitive test performance based on cultural differences

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  - How can we contribute to eradicating diversity challenges?
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“Trends” study methods

- Mailed anonymous 73-item surveys
- 512 doctorate level psychologists, members of INS or NAN
  - 25% usable response rate
  - 14.8 yrs (9.7) in practice
- Residing in the U.S. or Canada
- 91% of respondents were White

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“Trends”: Results
“Trends”: Results

<table>
<thead>
<tr>
<th>Source of Challenges</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of appropriate norms</td>
<td>307</td>
<td>47.2</td>
</tr>
<tr>
<td>Lack of appropriate tests</td>
<td>214</td>
<td>42.9</td>
</tr>
<tr>
<td>Difficulty finding a colleague to whom the person can be referred if patient needs</td>
<td>177</td>
<td>50.9</td>
</tr>
<tr>
<td>Lack of trained neuropsychologists or psychologists</td>
<td>56</td>
<td>10.4</td>
</tr>
<tr>
<td>Lack of training opportunities</td>
<td>56</td>
<td>10.4</td>
</tr>
<tr>
<td>Other</td>
<td>56</td>
<td>10.4</td>
</tr>
</tbody>
</table>

Note: Marginal totals do not total 100% because many respondents checked two or more challenges.

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Diversity in the Pacific Northwest: Questions for the audience

- What are some of the assessment challenges brought on by the ethnic/racial or other diversity of your clientele?
- How are these managed?

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Investigating some of the source of cultural differences
Culture-related variable #1: Education

Deconstructing race via Education in the US

• Assume that group labels are proxies for more meaningful measurable underlying factors
• Determine which aspects of the variable are expected to affect test performance
  – Premorbid
  – Change over time
• Determine relationship to test performance
• Adjust for significant educational factors before interpreting scores, regardless of race

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Deconstructing Education

• IQ
• Parent’s education
• Mother’s IQ
• Quantity of education
• Quality of education
• Exposure to mainstream culture
• Geographic region
• Motivation to perform well on tests
• Early life development
• Stereotype threat

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Example: Deconstructing nationality among Spanish speaking immigrants

• Educational quantity
• Educational quality
• Years in the US
• English fluency
• Early life nutrition
• Access to health care
• Chronic disease
• Acculturative stress
### Slide 64

**Per-pupil expenditures US States c. 1935**

<table>
<thead>
<tr>
<th>State</th>
<th>Black</th>
<th>White</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>17.50</td>
<td>53.18</td>
<td>.33</td>
</tr>
<tr>
<td>Florida</td>
<td>17.71</td>
<td>39.80</td>
<td>.45</td>
</tr>
<tr>
<td>Maryland</td>
<td>80.63</td>
<td>102.84</td>
<td>.78</td>
</tr>
<tr>
<td>Mississippi</td>
<td>13.36</td>
<td>58.61</td>
<td>.23</td>
</tr>
<tr>
<td>N. Carolina</td>
<td>32.92</td>
<td>51.43</td>
<td>.64</td>
</tr>
<tr>
<td>S. Carolina</td>
<td>18.62</td>
<td>67.74</td>
<td>.28</td>
</tr>
<tr>
<td>Virginia</td>
<td>33.05</td>
<td>63.81</td>
<td>.52</td>
</tr>
<tr>
<td>New York</td>
<td>110.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>75.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Slide courtesy of J. Manly*

### Slide 65

**Quality of school and current cognitive ability**

- Controlling for race and sex
- Childhood student-teacher ratio was a significant predictors of performance on measures of memory ($\beta = -1.08, p = .001$), executive function ($\beta = -.54, p < .001$), and language ($\beta = -.10, p = .005$).

*Slide courtesy of J. Manly*

### Slide 66

**Student Teacher Ratio**

*Slide courtesy of J. Manly*
Quality of education & reading level

- In 1960’s, economists began to relate school characteristics to achievement of students
  - Coleman report (Equality of Educational Opportunity Study)
- Achievement was measured with standardized tests of reading, math, and spelling
  - Reading level is relatively stable across adulthood & early dementia
  - We could use reading level to estimate quality of education among elders

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ETHNICITY, GRADE, AND READING LEVEL

<table>
<thead>
<tr>
<th></th>
<th>African-American</th>
<th>non-Hispanic White</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>125</td>
<td>74</td>
</tr>
<tr>
<td>reading level = actual grade</td>
<td>29%</td>
<td>47%</td>
</tr>
<tr>
<td>reading level &gt; actual grade</td>
<td>24%</td>
<td>35%</td>
</tr>
<tr>
<td>reading level &lt; actual grade</td>
<td>47%</td>
<td>18%</td>
</tr>
</tbody>
</table>

---

Reading ability accounts for ethnic group differences

<table>
<thead>
<tr>
<th>Test</th>
<th>African American</th>
<th>White</th>
<th>ANCOVA with WRAT-3</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRT Total recall</td>
<td>39.8</td>
<td>45.5</td>
<td>12.9**</td>
<td>1.7</td>
</tr>
<tr>
<td>SRT Delayed recall</td>
<td>5.8</td>
<td>6.7</td>
<td>8.9*</td>
<td>0.7</td>
</tr>
<tr>
<td>Benton figure recognition</td>
<td>7.4</td>
<td>8.1</td>
<td>26.4**</td>
<td>2.5</td>
</tr>
<tr>
<td>Orientation</td>
<td>9.7</td>
<td>9.8</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Abstract Reasoning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAIS-R Similarities</td>
<td>12.0</td>
<td>16.0</td>
<td>34.8**</td>
<td>3.7</td>
</tr>
<tr>
<td>Identities/oddities total</td>
<td>14.6</td>
<td>15.1</td>
<td>10.8*</td>
<td>1.8</td>
</tr>
</tbody>
</table>

* p < .01; ** p < .001

### Slide 70

**Reading ability accounts for ethnic group differences**

<table>
<thead>
<tr>
<th>Test</th>
<th>African American</th>
<th>White</th>
<th>ANCOVA with WRAT-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Mean</td>
<td>Mean</td>
<td>F</td>
</tr>
<tr>
<td>15-item Boston Naming</td>
<td>14.0</td>
<td>14.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Letter fluency</td>
<td>9.9</td>
<td>12.2</td>
<td>31.8**</td>
</tr>
<tr>
<td>Category fluency</td>
<td>14.6</td>
<td>16.8</td>
<td>31.4**</td>
</tr>
<tr>
<td>DDAE Repetition</td>
<td>7.8</td>
<td>7.8</td>
<td>0.0</td>
</tr>
<tr>
<td>DDAE Comprehension</td>
<td>5.5</td>
<td>5.8</td>
<td>13.4**</td>
</tr>
<tr>
<td><strong>Visual-spatial skill</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosen Drawing</td>
<td>2.6</td>
<td>3.0</td>
<td>30.0**</td>
</tr>
<tr>
<td>Benton Figure Matching</td>
<td>8.9</td>
<td>9.4</td>
<td>13.1**</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01


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**Summary**

- Years of education represent incommensurate values across ethnic groups in the US
- Literacy is a superior predictor of cognitive decline to years of education
- Racial difference in neuropsychological test performance and AD risk is explained when reading level is taken into account along with years of school

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**Culture-related variable #2**

- Childhood environment
Early Environmental Factors and Neuropsychological Test Performance
Byrd et al., 2006

Environmental Factors and Neuropsychological Test Performance in African-Americans: Aims

• Attempt to understand the source of ethnic test performance differences
• Address shortcomings in cross cultural neuropsychological literature
• Exploration
  – Understudied area in adults
  – Apply a novel/qualitative approach

Design

• Participants
  – African-Americans (n = 75); Caucasians (n = 25)
  – 60% Female
  – Age = 38.6 yrs (13.3)
  – Education = 14.0 yrs (2.3)
  – Exclusionary criteria:
    – Drug/alcohol dependence
    – Mental illness
    – Head injury w/LOC > 5 minutes
    – Other condition/neurological illness or diagnosed learning disability

• Measures
  – Background Information Scale (BIS)
  – Early educational experiences & parental influence factors
  – Comprehensive NP battery, WAIS-III Full scaled score
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**Ethnicity differences in aspects of early environment**

<table>
<thead>
<tr>
<th>Background Information Source</th>
<th>African-Americans</th>
<th>Caucasians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Educational Experiences</td>
<td>4.9 (2.7)*</td>
<td>6.4 (1.8)</td>
</tr>
<tr>
<td>SES/Parental Influence</td>
<td>5.2 (2.6)*</td>
<td>6.5 (1.5)</td>
</tr>
</tbody>
</table>

*p < .05

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**Background and Cognition: Bivariate correlations**

<table>
<thead>
<tr>
<th>All Subjects (n=100)</th>
<th>Full Scale IQ</th>
<th>Early Education</th>
<th>SES/Parental Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Score r</td>
<td>.45**</td>
<td>.20*</td>
<td>.25*</td>
</tr>
<tr>
<td>Dem cor T-Score r</td>
<td>.18*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*“p < .01, “p < .05, “p < .10

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**BIS & Ethnic Cognitive Test Disparity**

<table>
<thead>
<tr>
<th>Hierarchical Regression: BIS, Race --- FSIQ T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>SES, EE</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
</tbody>
</table>
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Summary

- African Americans scored below Caucasians on cognitive tests
- African Americans and Caucasians had measurably “different” background histories
  - Differences were slight
- Early environment did not substantially reduce ethnic difference on cognitive tests
  - Variance unaccounted for???

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Observations

- Recruitment strategies
  - Culturally sensitivity required for successful recruitment
- Qualitative differences in test taking behaviors not easily quantified
  - Timed tests
  - Relevance/performance motivation
  - Perceptions of testing

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Cancellation test performance among elders:
Role of ethnicity and cognitive style

Cognitive Style

Prior Research

- International samples
- Categorization differences between cultural groups
- Field dependence-independence
  - Analytical/holistic
  - Verbalizer/imager
  - Figure/whole

Cognitive style

- Preferred ways of thinking
  - Ways in which individuals prefer to solve problems, make decisions, perceive images
- The way in which one "reasons"
- May bias people to process certain types of information at the expense of other information
- Different from ability

Cognitive style: culture/ethnicity

- Culturally induced ways in which individuals organize and comprehend the world
- Cognitive styles may be shared by people of a cultural group
- Could contribute to ethnic group differences on cognitive tests
Cancellation tests

- Measure attention, psychomotor speed, visual search

- Typical performance measures:
  - Time to completion
  - Accuracy (hits/omission errors)
  - Location of errors
  - Commission errors

Shape Cancellation Test Performance

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Completion Time, seconds</th>
<th>Omission Errors</th>
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<tbody>
<tr>
<td>Caucasians</td>
<td>84.8 (25.9)</td>
<td>5.3 (3.8)</td>
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<tr>
<td>African-Americans</td>
<td>97.7 (41.4)</td>
<td>5.7 (4.1)</td>
</tr>
<tr>
<td>Hispanics</td>
<td>88.6 (28.3)</td>
<td>5.6 (4.1)</td>
</tr>
</tbody>
</table>

Conclusions

- Ethnicity has statistically significant effect on Cancellation test completion time

- Why somewhat slower?
  - Not a speed accuracy trade off
  - Time orientation/ time consciousness
  - Differential test relevance
  - Unknown factors

- What to do?
  - Diversify normative samples
  - Interpret low scores with caution in minority groups
Slide 88

Sources of errors on a nonverbal working memory task: Role of education, literacy, and search strategy
Byrd et al., 2005
Brain and Cognition 58, 251-257

Slide 89

Visual/NonVerbal Tests
- Non-verbal tests frequently used in cognitive assessment batteries
  - Non-English speakers
  - Analogue to verbal tasks
- Used in diagnostic batteries
- Ethnicity differences exist on these tests

Slide 90

Visual/Nonverbal Tests
- Nonverbal tests are considered “culture fair”
- Significant racial/ethnic differences reported on:
  - All WAIS-III performance subtests
  - Benton Visual Retention Test
  - Psychomotor speed tests
  - Cancellation tests
- The impact of culture and education on nonverbal neuropsychological measurements: a critical review. Roselli & Ardila, 2003
Slide 91

“Culture free” visual tests: Failure of Universalism

“...that a test or test battery is "culture free" is a description born in the never-never land of psychometric wishful thinking that at once brands the claim as spurious.”

Nell, 2000

Slide 92

Previous WHICAP pilot

- Hispanics earned significantly lower scores on BVRT matching and recognition subtests
- Low education (<8 yrs) related to errors in detecting similar shape, but not order, of target stimuli

Slide 93

Similar work

- Non-demented French elderly (Le Carret, et al., 2003)
  - Educational differences and BVRT performance
  - Higher educated samples used more exhaustive search strategy
    - Efficiency of executive working memory
    - Cognitive reserve
Hypotheses

• The influence of literacy on nonverbal working memory will supercede education effects
• Elders with lower literacy will preferentially select distractors that differ in shape, rather than order
• The lower literacy group will display bias for location of items in the upper half of response display secondary to a less efficient literacy based search strategy during a matching task

Participants

• 100 African-American older adults in New York City
• Neurologically healthy
• Age M = 75.7 yrs (5.9; 65-92 yrs)
• Years of education M = 12.2 (3.1; 5-18 yrs)
• Gender = 75% Female
• Exclusion criteria:
  – History of Parkinson’s disease, stroke, alcohol abuse, or serious mental illness such as depression or schizophrenia

Measures

• WHICAP NP battery
  – BVRT Multiple and single item matching tasks
• WRAT-3 Reading Recognition subtest
• Modified experimental versions of the BVRT:
  – One target stimulus per trial, reduced demand, Y/N response
  – One target stimulus and a 2x2 array including 3 distractors and the target stimulus.
• 84 items
  – 22 Targets
  – 32 Order distractors
  – 30 Shape distractors
**Literacy Level Descriptives**

- Completed years of education-reading grade level equivalent discrepancy
  - 35% below grade level
  - 31% at grade level
  - 34% above grade level
- Literacy level < 12 years n = 31
- Literacy level >12 years n = 69

---

**Single item matching: Literacy level and error type**

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<th>Low Literacy (n = 31)</th>
<th>High Literacy (n= 69)</th>
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<tr>
<td></td>
<td># Correct</td>
<td># Correct</td>
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<tr>
<td>Target (max = 22)</td>
<td>21.2 (1.2)</td>
<td>21.5 (1.1)</td>
</tr>
<tr>
<td>Order Distractors (max = 32)</td>
<td>29.6 (5.9)</td>
<td>31.7 (1.4)*</td>
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<tr>
<td>Shape Distractors (max = 29)</td>
<td>26.2 (2.8)</td>
<td>28.4 (.90)**</td>
</tr>
</tbody>
</table>

* p<.01

---

**Literacy level and error location**

- BVRT multiple choice matching (max = 15)
- Proportion of successful response choices by location of target
  - (# correct responses/# of correct opportunities)

<table>
<thead>
<tr>
<th></th>
<th>Low Literacy</th>
<th>High Literacy</th>
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<tbody>
<tr>
<td></td>
<td>Mean total = 12.0 (2.0)</td>
<td>Mean total = 14.2 (1.1)</td>
</tr>
<tr>
<td>90%</td>
<td>89%</td>
<td>98%</td>
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<tr>
<td>79%</td>
<td>71%</td>
<td>92%</td>
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<tr>
<td>98%</td>
<td>95%</td>
<td>94%</td>
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</tbody>
</table>
Conclusions

- Low literates produce increased shape and order errors
  - Perceptual bias
  - Unfamiliarity with stimuli
- Poor performance on BVRT partially due to perceptual distortion among elders with low literacy levels
- Literacy related to executive search strategy

Future directions

- Explore the developmental transmission of cognitive styles that bias persons to a particular strategy
- Experimental tests designed to elicit different cognitive styles: how malleable is cognitive style
- Qualitative research
  - Focus groups, error analyses

Culture-related variable #3

Stereotype threat
Stereotype Threat

Stereotype threat is defined as a condition when a person is "at risk of confirming as self-characteristic, a negative stereotype about one’s group."

(Steele & Aronson, 1995)

The resulting anxiety and pressure to perform so as to not confirm the stereotypical performance expectation actually inhibits performance, thereby confirming the stereotype.

Stereotype Threat

• "Stereotype threat" has been found to account for discrepancies on a number of performance-related variables (e.g., IQ, math).

• Minorities may be particularly prone to stereotype threat when placed in a position where they could be judged as confirming the stereotype.

• The pressure to not conform to the stereotype creates anxiety, which in turn adversely affects performance (Steele et al., 1995).

Individual Differences in Susceptibility to Stereotype Threat

• Extent of identification with stereotyped group

• Identification with multiple social groups – achieved vs. ascribed identities

• Importance assigned to the relevant performance domain

• Locus of control

• Susceptibility to negative thoughts
Slide 106

**Common Characteristics of Stereotype Threat**

- It is activated by a particular occurrence
- The type and degree of the threat varies from group to group across settings
- To experience it, you do not have to believe the stereotype or think it applies to you
- The effort to overcome stereotype threat by disproving the stereotype can be daunting

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**The Effects of Stereotype Threat are Broad**

- Hispanics and academic performance (Gonzales, Blanton, & Williams, 2002; Schmader & Johns, 2003)
- Students from low socioeconomic backgrounds and with poor academic performance (Croizet & Claire, 1998)
- Females in math (Good, Aronson, & Harder, 2008; Inzlicht & Ben-Zeev, 2000; Spencer, Steele, & Quinn, 1999)
- White males when faced with the specter of Asian superiority in math (Aronson, Lustina, Good, Keogh, Steele, & Brown, 1999; Stone, Lynch, Sjomerling, & Darley, 1999)

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**How Stereotype Threat Affects Cognitive Performance**

- Lower expectations
- Increased self-doubt
- Inefficiency of processing
- Reduced speed and accuracy
- Distraction
- Narrowed attention
- Anxiety
- Self-consciousness
- Withdrawal of effort or over effort
- Taxing working memory
Physiological Responses

- Increased blood pressure
- Increased heart rate
- Increased cortisol levels
- Increased sympathetic nervous system activity
- Increased perspiration

(Smith, 2004 & Schmader, Johns & Forbes, 2007)

Stereotype threat, perceived discrimination, and examiner-examinee racial discordance on neuropsychological assessment


Hypotheses

- Hypothesis 1 African American (but not Caucasian) participants would perform significantly worse in the stereotype threat condition compared to African Americans in the non-threat condition.
- Hypothesis 2 African Americans would perform worse when tested by an examiner of a different race, and this would be amplified in the stereotype threat condition. We did not expect race of examiner to affect performance among Caucasian participants.
Methods and Procedures

- 92 healthy participants (45 African Americans & 47 Whites) were randomly assigned to a stereotype threat versus non-threat condition.

**Stereotype threat Condition**: “You will be taking a series of tests that are reflective of cognitive abilities; various personal factors may lead to poor performance on these types of tasks. Your results will be compared to your peers.”

**Non-threat Condition**: “We are experimenting with different types of cognitive measures, so relax and try your best.”

- Participants within conditions were randomly assigned to either an African American or White examiner.

- Completed measures of perceived discrimination and a neuropsychological test battery.

Measures

- Neuropsychological Battery
  - Reading ability/Premorbid IQ
  - Attention/Processing Speed
    - Wechsler Test for Adult Reading (WTAR)
    - WAIS-IV Digit Symbol Coding
  - Memory
    - Brief Visuospatial Memory Test (BVMT-R)
    - Trails Part A
    - Hopkins Verbal Learning Test (HVLT-R)
    - WAIS-IV Letter Number Seq.
    - Stroop Interference Task

- Perceived Ethnic Discrimination Questionnaire (PED-Q; Contrada et al., 2001) – 17-item questionnaire
  - Social exclusion
  - Stigmatization
  - Workplace discrimination
  - Threat/harassment

Results – Stereotype threat

Figure 1. Interaction between examinees race and exp condition on global neuropsychological performance.
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Summary of findings

• Stereotype threat can affect neuropsychological performance
• Perceived discrimination adversely affects neuropsychological performance for African Americans.
• Racial similarity between examiner and examinee appears to attenuate some of the adverse effects of perceived discrimination, but not stereotype threat on neuropsychological performance

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Deconstruction of Race/Ethnicity: Implications and Controversies

• Race and ethnicity are proxies for underlying variables that may be more powerful predictors of test performance than group identity alone
• Weighing clinical value versus research value
• Race may be most efficient variable for clinical use
• Uniform impact across age and cultural groups is unlikely
• Large cohorts, followed longitudinally, are needed to disentangle relationships
• Increased use of more sophisticated statistical techniques (IRT, DIF, SEM) is needed

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What about cultural effects in pediatric assessments?

• Paucity of studies dedicated to study of culture and NP test performance in children (<1% in 5 year period)
• Results of ethnic difference studies among US children not consistent
• More complex and variable performance patterns exist among child groups
• Need for replication studies and studies with similar designs to allow for meta analyses
• Variable reporting of ethnicity in published studies
• Pediatric studies published in wider variety of disciplines vs adult studies
• Too little evidence to arrive at any strong conclusions regarding the role of culture in the neuropsychological assessment of REM children
Empirical “holes” in pediatric literature

- Articulation of most salient cultural factors that influence test performance in childhood
- The presence (or absence), degree, and domain specificity of ethnicity related differences
- The point of emergence and developmental trajectory of differences observed in adulthood
- Relationship between cultural performance patterns and traumatic brain injury/disease (dementia, HIV, hydrocephalus)
- Cultural factors that promote cognitive resiliency
- Clinical management of cultural differences in test performance and implications for intervention and rehabilitation

Guiding questions:
Cross-cultural neuropsychology (CCNP) assessment challenges

- Why is diversity accompanied by challenges?
- What are the primary diversity challenges?
- How can we meet these challenges in our practice?
- How can we contribute to eradicating diversity challenges?

Cross Cultural Neuropsychology
Practical tools/applications
How to evaluate the utility of available normative sets for the evaluation of culturally/linguistically diverse clients:

A guiding framework

Neuropsychological Normative Data

- As a discipline, we can be no better than the quality of our normative data
- Fundamental to the interpretation of NP test results is the determination of abnormal scores
  - Achieved through comparison to expected levels of performance
- Too many practitioners fail to critically evaluate the demographic and psychometric properties of normative data
  - Particularly important in cross cultural evaluations
  - In most cases, ethnicity specific normative data is the best choice for ethnic minority clients
General norming principles

- Adequate norms especially important in child NP given nonlinear development of cognitive abilities
- Characteristics of “good norms”
  - No uniform standards currently exist
  - Minimum evaluative criteria (Mitrushina & Boone, 2005)
  - Adequate sample size
  - Recently collected data
  - Adequate screening techniques applied to persons in normative sample to ensure neurologic health
- Many neuropsychologists apply a mix of normative data for specific tests included in a battery

How many is enough?
Determining optimal sample sizes for normative studies in neuropsychology

- Most child neuropsychological tests have grossly inadequate standardization sample sizes
- The authors’ study of confidence intervals (CI) and the impact of sample sizes on CIs revealed:
  - Ideal sample size = 50-75 per cell
  - Fewer than 50 per cell can result in CI that are too large to be clinically useful

Shortcomings of NP norms

- Wide disparity in the availability and applicability of appropriate normative data, especially for child and adolescent tests
- Many norms are region specific (vs. population-based)
- Stratified (vs. pooled) groups
- Too few for clinical samples
- Very small cell sizes at extremes of distribution
- More complete demographic data on normative samples
  - Ideally all normative sets would include:
    - Age & educational grade level
    - Gender
    - Race/ethnicity
    - Intelligence level
    - Handedness
    - Degree of bilingualism, if applicable

References:

Mitrushina, 2005
Bridges & Holler, 2007
Baron, 2004
General critique: norms

- Too few empirical studies
  - Need more investigations of base rates, validation/psychometric properties, and translation/adaptation of commonly used tests
- Not yet known if ethnicity-specific norms will increase diagnostic utility of NP tests in child samples as they do in adult samples
- Investigators require greater support in the acquisition of quality normative data and related normative research
  - Increased funding from government and private sources needed

Race/Ethnicity Specific Norms

- Advantages
  - Increased specificity of NP measures
  - Improved diagnostic accuracy
- Disadvantages
  - Don't elucidate group differences
  - Don't address problems with construct validity/cultural equivalence
  - May underestimate true impairment

Manly, 2005; Manly & Echemendia, 2007

Norms

- When to use race/ethnicity specific norms?
  - It depends....
  - Descriptive Purposes?
  - Diagnostic Purposes?

Busch et al., 2005; Manly & Echemendia, 2007
Assessing persons whose language you do not speak: considerations
Assessing persons whose language you do not speak:

**considerations** (Judd et al., 2009)

- The most appropriate assessment language for any examinee is their native language
  - A valid and appropriate use of a translated, unadapted measure requires administration in the language of tests' origin
- If possible, determine degree of bi/multilingualism for reading, speaking and comprehension
- Determine personal level of competency for completing the evaluation
  - If not competent, refer/consult with a qualified colleague
- If unable to refer, consider use of a trained interpreter
  - Avoid use of family members or lawyers as interpreters

Assessing non-English speakers, cont

- Simple/real time translation of tests is inadequate
  - Creates more problems than it solves
  - Neuropsychologists unable to ensure verbatim translation in test instructions and examinee responses
  - Standard norms invalid once test translated
- Tests should be adapted for use in other cultures
  - Translated (forward and backward), psychometrically/culturally valid (Helms, 1992)
- Consider dialect differences
  - Is the Spanish spoken by Mexicans equivalent to that of Spaniards?
- If no other choice than substandard evaluation:
  - Frame assessment as qualitative and make reservations/limitations explicit in report
  - Consult with a competent colleague regarding your conclusions

Assessing persons whose language you do not speak

- Be explicit in report how language discordance influenced assessment process and interpretation of scores
- Consider how language discordance will impact delivery of feedback and recommendations
  - Have a plan for translation and interpretation of client questions
Cultural Competence: What is it?

- Awareness of one’s own assumptions, values, biases, and stereotypes about ethnic minorities; how such beliefs and attitudes could negatively impact the provision of neuropsychological services; and the development of a positive stance towards multiculturalism.
- Knowledge and understanding regarding one’s own worldview and that of one’s clients, specific knowledge regarding the culture of one’s clients, and understanding of sociopolitical influences.
- Acquisition of specific, culturally appropriate assessment, intervention, and communication skills necessary to effectively work with ethnic minority groups.
- At the organizational level, core cultural competencies consist of developing new theories, practices, measures, guidelines, etc.

Becoming culturally competent

- Provide information in writing re: purpose of evaluation, use of results, limits of confidentiality, etc. Ideally, provided in the client’s language.
- Seek out educational and training experiences to enhance understanding of the cultural groups being served, psychometric developments and updates to instruments.
- Establish reliable procedures for assessing ethnicity and other cultural factors.
- Gain consistency in how to classify clients of mixed “race” lineage.
- Recognize the limits of current competencies and expertise. Seek consultation and/or make referrals.

- Stay abreast of relevant research and practice issues related to the populations being served.
- Acknowledge that ethnicity/culture impact test performance and take those factors into account when working with various cultural groups.
- Consider the validity of a given instrument and interpret resulting data keeping in mind the cultural and linguistic characteristics of the person being assessed.
- Remain aware of the test’s reference population and possible limitations of using such tests with populations who are demographically different.
- Recognize that being a member of a culturally different group does not guarantee cultural competence.
Cultural Competence at each stage of the NP assessment process

An ethical obligation to take into account the cultural, linguistic, and educational backgrounds of our clients in all aspects of our practice:
- measures and normative standards
- the languages in which we are competent to assess
- the educational materials we provide
- the recommendations we make

Applied cultural competency: Suggestions

1) Referral
- Gather adequate information to determine if case is within your domain of competency
- Language planning in context of reason for referral
- Cultural plan to handle case of cultural mismatch, etc.

2) Test & normative data selection
- Consult literature for recent developments w/ measures
- Consider purpose of evaluation (diagnostic or descriptive)
- Evaluate psychometric appropriateness of tests/normative group under consideration, particularly if client is bilingual
- Review translated/Adapted tests (consider if translation completed in US)

- Nonverbal is not necessarily culture fair

3) Interview
- Language: determine proficiency of client; do not rely on self-report
- Standardize interview so that behavioral displays become more similar
- Remain sensitive to cultural influences on rapport building & perceptions of testing session
- Do not assume awareness of the purpose of the assessment, limits of confidentiality, implications of test results (e.g., depression, impaired performance, etc.)
Applied cultural competency: Suggestions

4) Test administration
- Sensitize psychometrists to any potential cultural nuances
  - Limited English proficiency clients
  - Avoid use of interpreters including the use of the child client as
    interpreter for parent
  - Review published works by Ardila, Judd, Llorente and Rivera-Mindt
    for full exploration of the management Spanish-speaking
    bilingual clients
  - Trained interpreters can omit, substitute or add words
  - Real time translation does not allow for careful consideration for difficult
    clinical issues
  - Impact of dialect/regional differences in interpreter and client
- Consider the “process” approach as an alternative to quantitative
  - Qualitative data may provide valuable insights on cognitive functioning
  - Testing of limits

Applied cultural competency: Suggestions

5) Interpretation/Recommendations
- Review psychometric characteristics of measures again
  to determine how “low” scores should interpreted to avoid
  misdiagnosis and mismanagement of neurocognitive disorders
- Support the diagnosis with confirmatory data from functional
  evaluations, reports from collateral sources, and the results of
  medical tests
- Suggest longitudinal assessments to observe change over time
- Explicitly state normative data sets used if different from manual;
  discuss limits on interpretations
- Be careful not to erroneously attribute potential cognitive
  problems to culture/language status

Guiding questions:
Cross-cultural neuropsychology (CCNP) assessment challenges
- Why is diversity accompanied by challenges?
- What are the primary diversity challenges?
- How can we meet these challenges in our practice?
- How can we contribute to eradicating diversity challenges?
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What you can do now

• Search literature regularly for updates on relevant studies
  – Initiate culture journal clubs, study groups, etc.
• Reach out to authors of relevant studies to inquire re: consultation, referrals, etc.
• Search resources in other disciplines
  – Education, Speech and Language, Neurology, Sociology, Social Work
• Join/create special interest groups
• Search programming at conventions
  – Request more sessions on culture when programming is lacking

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What you can do now

• Advocate to enhance assessment equity
  – Graduate training programs to enhance training in culture-NP issues & develop culturally sensitive training standards for future psychologists
  – Training supervisors can model the need for consultation, when appropriate
  – Acknowledge and discuss controversial history of psychometric testing and methods for avoiding the repeat of historic mistakes
  – Advanced training opportunities in cultural issues
  – Enhanced continuing education opportunities

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What you can do now

• Support the training of an ethnically and linguistically diverse body of professionals
• Enhance referral networks
General Conclusions & Directions

• While progress has been made, significant research is required to advance the subspecialty of cross cultural neuropsychology

• Advocacy needed:
  – Pressure on funding agencies to support normative research
  – Develop special requests for proposals
  – Editors of journals should require that authors of manuscripts address diversity and report cultural factors in descriptions of participants

General Conclusions & Directions

• Advocacy needed, cont:
  – Professional organizations to establish cultural practice standards
  – Test development, translation, test adaptation, evaluation of bilingual clients, normative data
  – Pressure training programs to enhance training in culture-NP issues & develop training standards for future psychologists
  – Field placements to allow practice of cross-cultural assessment with both clinical and academic supervision
  – Model the need for cultural consultation to students, when appropriate
  – Advanced training opportunities in cultural issues for professionals
  – Enhanced continuing education opportunities

Resources

Reading Resources:

• The Issues of Diversity in Clinical Neuropsychology Series (Springer Press; Series Editor: E. Fletcher-Janzen), which includes an exceptional volume by Llorente (2008) on neuropsychological evaluation with Latinos.

• Wong & Fujii (2004) for an excellent overview on evaluation with Asian Americans, including demographic and cultural considerations, as well as practical guidelines.

• Wong (2000) and Paniagua (2005) for broader overviews and useful suggestions for working with ethnically diverse clients.

• American Psychologist (2002; Volume 57 [2]) for discussion on poverty, culture, and learning in psychology.

• AACN Practice Guidelines for Neuropsychological Assessment and Consultation (2007)

Thank you!

Acknowledgements
Monica Rivera-Mindt, PhD
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Diane Scheiner, PhD
Ida Sue Baron PhD
Mike Westerveld, PhD

Primary collaborator
Selected references

Selected references


Norms & Instruments

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<th>NP Norms</th>
<th>AA</th>
<th>Asian</th>
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<th>NHW</th>
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Note: AA=African American; NHW=Non-Hispanic White

Norms table slides courtesy of Monica Rivera-Mindt, PhD
### Slide 160

**Norms & Instruments**

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### Slide 161

**Norms & Instruments**

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<th>NP Instruments</th>
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<td>Woodcock-Muñoz Language Survey-Revised (Woodcock, et al., 2005)</td>
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### Slide 162

**Norms & Instruments**

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<td>Ostrosky-Solís et al. (1999). NEUROPSI: A brief neuropsychological test battery in Spanish with norms by age and educational level. JINS, 5, 413-433.</td>
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### Sociocultural Instruments

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<td>Bicultural Self-Efficacy (BISE; Soriano &amp; Bandura, 1994)</td>
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### Norms & Instruments

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### Norms & Instruments

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<tr>
<th>Instrument</th>
<th>AA</th>
<th>Asian</th>
<th>Latino</th>
<th>NHW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acculturation Rating Scale for Mexican Americans (ARMSA; Cuellar et al., 1980)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American Acculturation Scale Short Form (AAAS-SF; Landrine &amp; Klonoff, 1995)</td>
<td>X</td>
<td></td>
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</tr>
</tbody>
</table>

*Note. AA=African American; NHW=Non-Hispanic White*