Unpacking Linguistic Competence in Neuropsychology:

Bridging Science to Clinical Practice in the Assessment of Bilingual Individuals

Speakers

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Acknowledgements

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- Former and Current CNI/CNP Trainees
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- Hispanic Neuropsychological Society (HNS)
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- International Neuropsychological Society (INS)

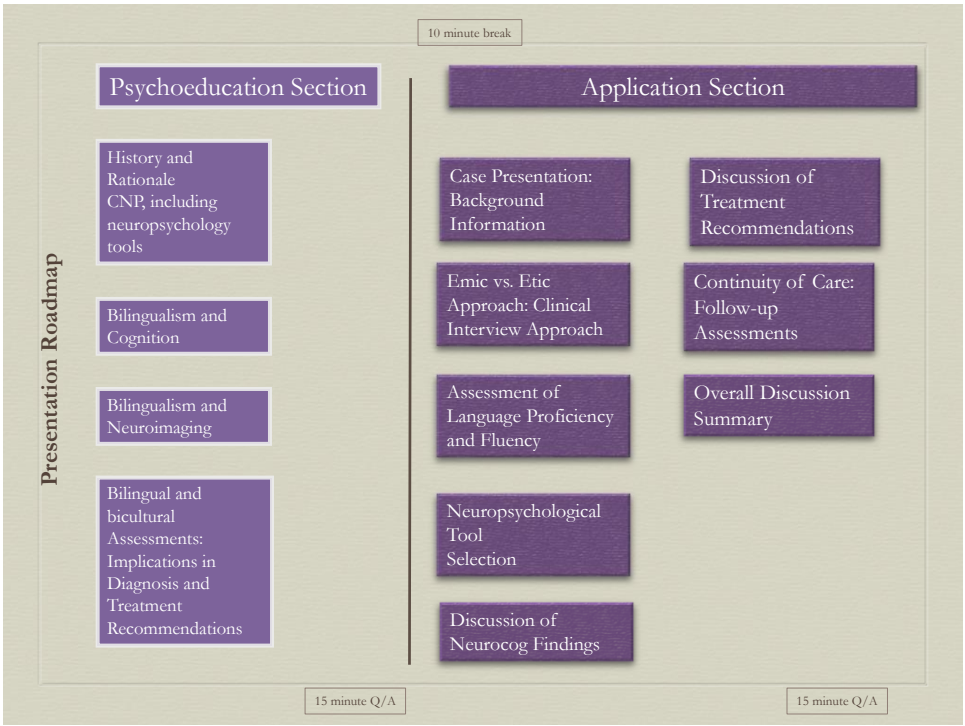
Objectives

Psychoeducation Section

- Describe the neurocognitive and neuroanatomical correlates of bilingualism and explain the limitations of our goal standard neuropsychological tools/norms when assessing bilingual individuals

Application Section

- Assemble a linguistically competent neuropsychological protocol based on objective measures of language proficiency and fluency
- Analyze a datasheet summary from a bilingual neuropsychological framework
- Differentiate the clinical outcomes applying a bilingual neuropsychological framework



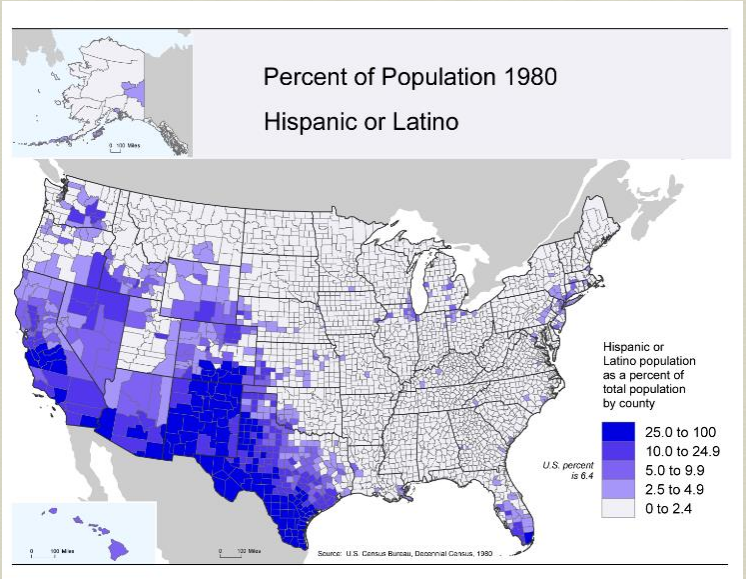
Psychoeducation Section

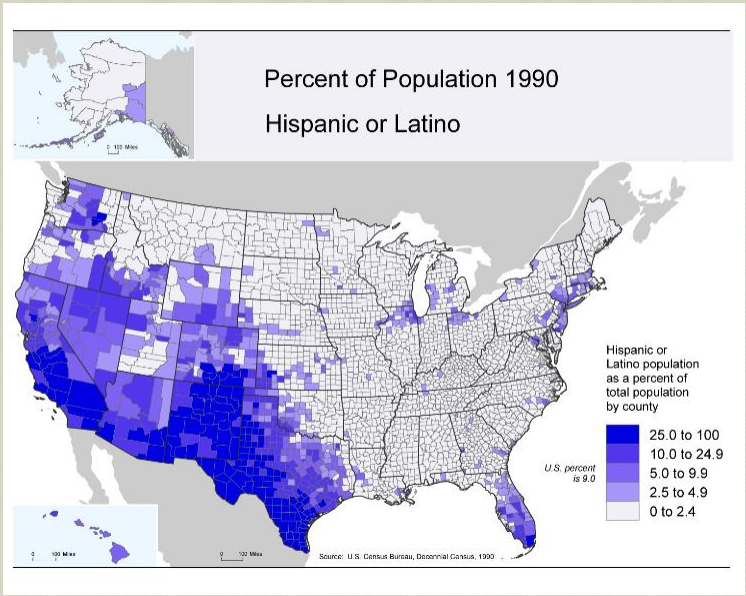
CNP History

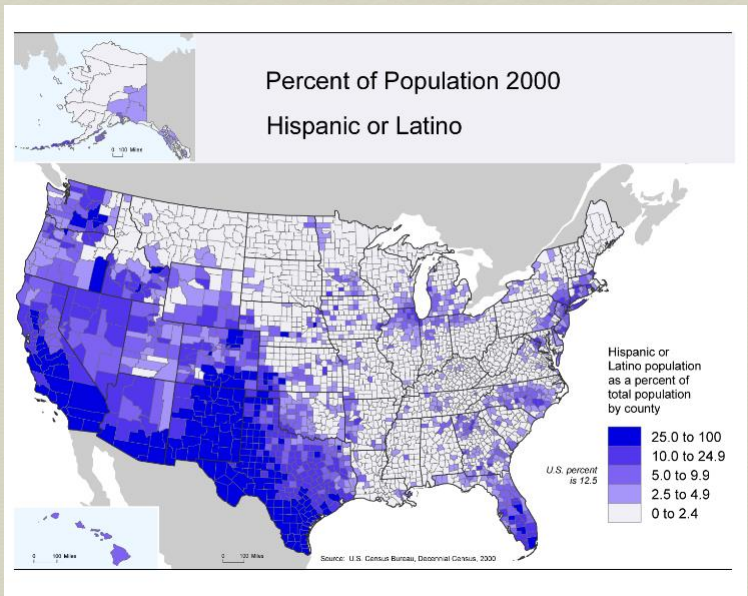
Bilingualism: Cognition and Neuroscience

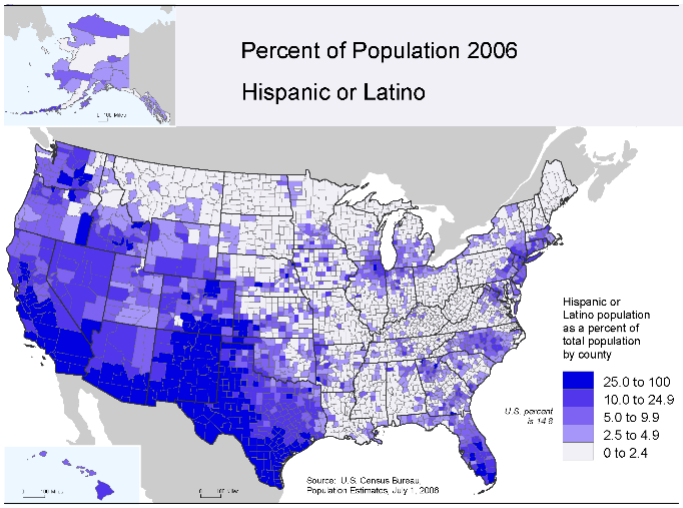
History and Rationale

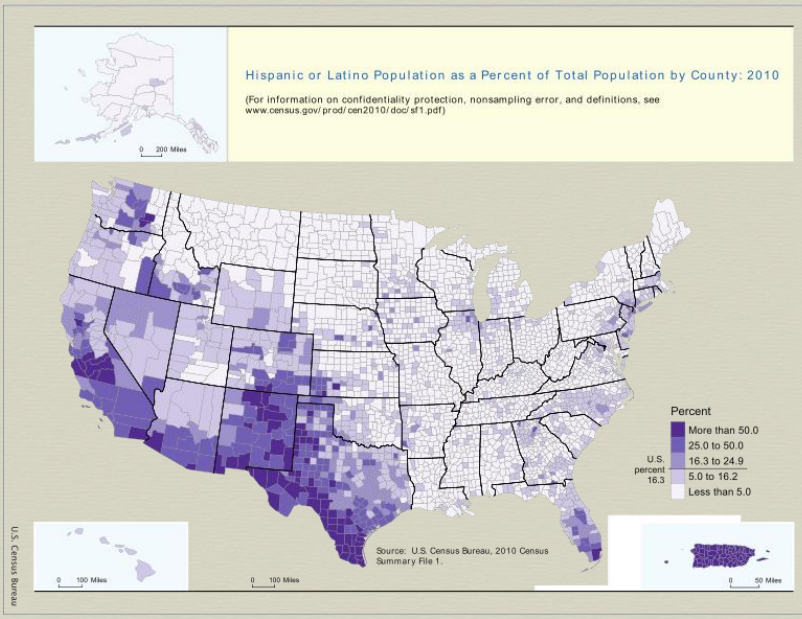
From Cultural Neuropsychology Initiative (CNI)
To Cultural Neuropsychology Program (CNP)

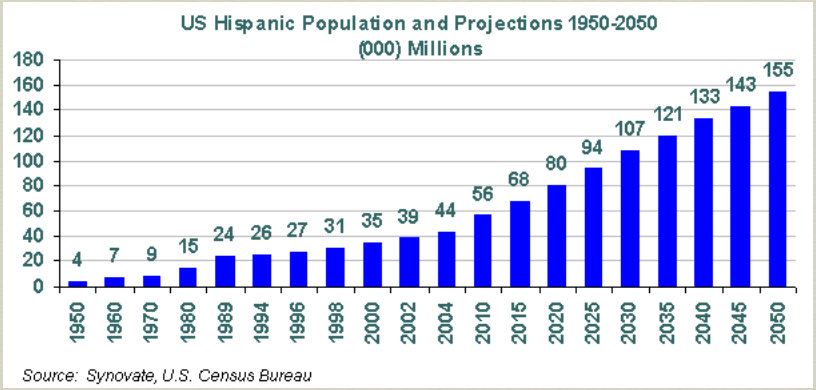


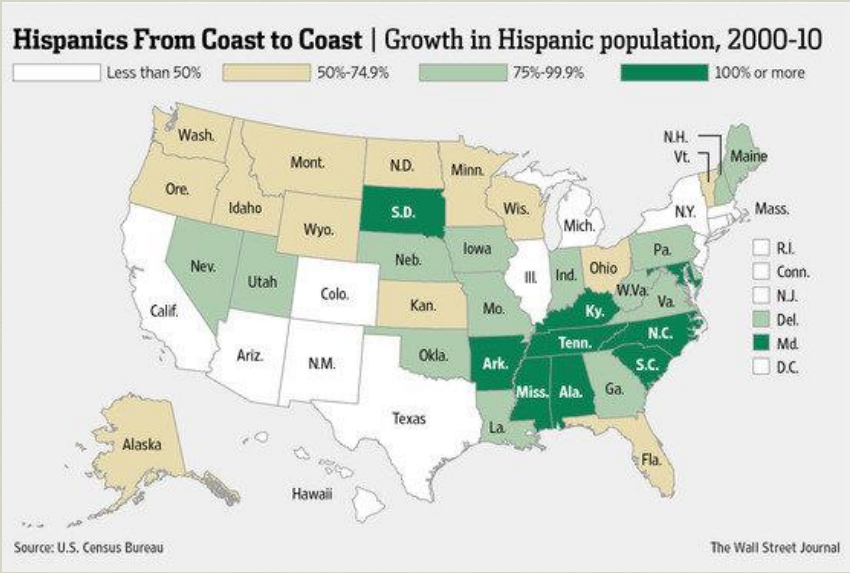

Percent of Population 1990
Hispanic or Latino
Hispanic or Latino population as a percent of total population by county
25.0 to 100
10.0 to 24.9
5.0 to 9.9
2.5 to 4.9
0 to 2.4
U.S. percent is 9.0
Source: U.S. Census Bureau, Decennial Census, 1990


Percent of Population 2000
Hispanic or Latino
Hispanic or Latino population as a percent of total population by county
25.0 to 100
10.0 to 24.9
5.0 to 9.9
2.5 to 4.9
0 to 2.4
U.S. percent is 12.5
Source: U.S. Census Bureau, Decennial Census, 2000


Percent of Population 2006
Hispanic or Latino
Hispanic or Latino population as a percent of total population by county
25.0 to 100
10.0 to 24.9
5.0 to 9.9
2.5 to 4.9
0 to 2.4
U.S. percent
Source: U.S. Census Bureau

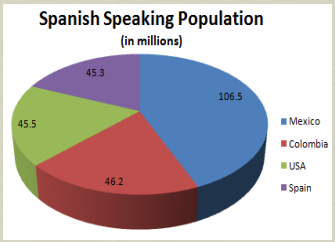

Hispanic or Latino Population as a Percent of Total Population by County: 2010
(For information on confidentiality protection, nonsampling error, and definitions, see www.census.gov/prod/cen2010/doc/sf1.pdf)
Percent
More than 50.0
25.0 to 50.0
16.3 to 24.9
5.0 to 16.2
Less than 5.0
U.S. percent 16.3
Source: U.S. Census Bureau, 2010 Census Summary File 1.
U.S. Census Bureau


US Hispanic Population and Projections 1950-2050
(000) Millions
180
160
140
120
100
80
60
40
20
0
4
7
9
15
24
26
27
31
35
39
44
56
68
80
94
107
121
133
143
155
1950
1960
1970
1980
1989
1994
1996
1998
2000
2002
2004
2010
2015
2020
2025
2030
2035
2040
2045
2050
Source: Synovate, U.S. Census Bureau


Hispanics From Coast to Coast | Growth in Hispanic population, 2000-10
Less than 50%
50%-74.9%
75%-99.9%
100% or more
Wash.
Ore.
Calif.
Idaho
Nev.
Mont.
Wyo.
Utah
Ariz.
Colo.
N.M.
N.D.
S.D.
Neb.
Kan.
Okla.
Texas
Minn.
Iowa
Mo.
Ark.
La.
Wis.
Ill.
Mich.
Ind.
Ohio
Ky.
Tenn.
Miss.
Ala.
W.Va.
Va.
N.C.
S.C.
Ga.
Fla.
Pa.
N.Y.
N.H.
Vt.
Maine
Mass.
R.I.
Conn.
N.J.
Del.
Md.
D.C.
Alaska
Hawaii
Source: U.S. Census Bureau
The Wall Street Journal

Demographics

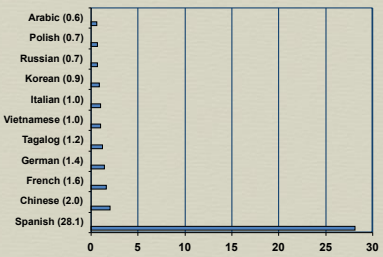
- The U.S. has the 2nd largest Hispanic population in the world (53 million with Puerto Rico included)
- 17% of the U.S. population, 53 million
- The U.S. has the 3rd largest Spanish-speaking population in the world (38 million, 12% of the population).

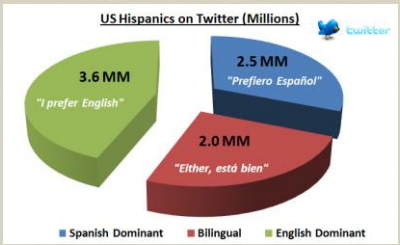


http://www.infoplease.com/spot/hhmcensus1.html

Demographics: Language

- Speakers of Language Other Than English in U.S. Households (2010 U.S. Census)





Demographics: UCLA Health

60.2% of the service area population is White; 16.5% of residents are Hispanic/Latino; 13% are Asian; 6.2% are African American; and 4.1% are American Indian/Alaskan Native, multiple or other race/ethnicity. The service area has a higher percentage of Whites and a lower percentage of Hispanics than found in the county and state.

English is spoken in the home among 64.4% of the service area population. Spanish is spoken at home among 13.3% of the population; 8.1% of the population speak an Asian language; and 11.8% of the population speaks an Indo-European language at home.

Race/Ethnicity

	UCLA Health Service Area	Los Angeles County	California
White	60.2%	26.4%	39.7%
Hispanic/Latino	16.5%	48.8%	37.9%
Asian	13.0%	14.0%	13.1%
Black/African American	6.2%	8.0%	5.7%
Other / Multiple	3.8%	2.4%	2.9%
Native Hawaiian/Pacific Islander	0.2%	0.2%	0.4%
American Indian/Alaska Native	0.1%	0.2%	0.4%

Source: U.S. Census Bureau, American Community Survey, 2009-2013, DP05.http://factfinder.census.gov

Language Spoken at Home, Population 5 Years and Older

	UCLA Health Service Area	Los Angeles County	California
Speaks only English	64.4%	42.9%	56.3%
Speaks Spanish	13.3%	39.6%	28.8%
Speak Indo-European language	11.8%	5.6%	4.4%
Speaks Asian/Pacific Islander language	8.1%	10.9%	9.6%
Speaks other language	2.4%	1.1%	0.9%

Source: U.S. Census Bureau, American Community Survey, 2009-2013, DP02.http://factfinder.census.gov

The Cultural Neuropsychology Initiative (CNI) 2010-2018

- A clinical service to provide Spanish and bilingual neurocognitive and psychodiagnostic assessments
- A training program to help develop the next generation of culturally and linguistically competent clinical neuropsychologists
- A new base for clinical and translational research with an explicit multicultural focus on brain health

Socially Responsible Neuropsychology

- Practicing socially responsible neuropsychology (SRN) challenges our field to engage in individual and **organizational** practices that benefit all patients in an **equitable** manner regardless of their race, ethnicity, sex, language, or sexual orientation (Suarez et al., 2016).
- However, **as a field**, we continue to fall short in judiciously providing equitable care for all patients, in part, due to insufficient emphasis on the development of **competencies** relevant, which leads to lack of accountability, to working with culturally and linguistically diverse patients through the course of neuropsychological training.

Suárez, P., Casas, R., Lechuga, D., Cagigas, X. Socially Responsible Neuropsychology in Action: Another Opportunity for California to Lead the Way. Feature in The California Psychologist. Fall of 2016.

CNI Modus Operandi

- Building resilience in providers is as important as cultural and linguistic competence
- Bilingual supervision in an open and inclusive case conference environment
- Multidisciplinary input and convergence of ideas to triangulate best practice
- Patient-centered clinical pathway
- Reconfiguration and/or allocation of resources
- Reframing of cultural and linguistic knowledge as skills and competencies

CNI: Leveraging the Pipeline

- Direct clinical service for patients
- Multiplicative impact of students/trainees
- Students/trainees learning alongside attending doctors
- Feedback to structural components of a health system
- Community engagement within own institution and beyond borders
- Disruptive Innovation…

Cultural Neuropsychology Program (CNP)

- **New Hispanic Neuropsychiatric Center of Excellence at UCLA**
  - The evolution of a program…
  - The dissemination of a model…
  - The articulation of a specialization…
  - A step toward the revitalization of cultural neuropsychology…

Bilingualism

Cognitive Correlates
Neuroanatomical Substrates

Bilingualism: Theoretical Framework

- **Interference Hypothesis**
  - While interacting in two languages (e.g., English and Spanish), bilinguals' capacity to communicate in one language decreases as a function of the second language, interfering with their language-based cognitive processes.
  - Bialystok and colleagues have documented a bilingual advantage in executive function in children and adults.
  - While other studies done by Tamar Gollan and colleagues, have shown worse performance on certain tasks (i.e., vocabulary, category fluency).

Bilingualism: Cognition

- **The Inhibitory Control Model**
  - A refinement of the interference hypothesis
  - Bilinguals must suppress the non-target language to allow production of the intended language (Green, 1998).
  - Practice of executive and attentional control
  - Predicts a bilingual advantage on tasks requiring these abilities

Bilingualism: Neuroimaging

- **Neurocognitive model for bilingual language control** (Abutalebi & Green, 2007; 2008)
  - Dorsolateral prefrontal cortex (DLPFC) controls executive functioning
  - Anterior Cingulate Context involved in inhibition
  - Caudate Nucleus involved in lexical selection and goal planning
  - All three brain structures proposed to be involved in switching

Bilingualism: Neuroimaging

- Neuroimaging studies with healthy bilingual adults have revealed more grey matter density in structural areas particularly associated with language, memory, and attention (Mechelli et al., 2004).
- Neuroimaging studies have found that life-long bilingualism is positively associated with greater white matter integrity (Luk, Bialystok et al., 2011; Gold et al., 2013; Olsen et al., 2015) and greater grey matter density (Abutalebi et al., 2014, 2015) in frontal, temporal and parietal structures.
- **Functional neuroimaging** studies have preliminarily linked bilingualism with increased activation in the fronto-striatal- temporal circuitry, particularly when engaging in switching between languages (reviewed by Luk et al., 2011).
- A recent **resting state imaging** study identified stronger intrinsic functional connectivity in the frontoparietal control network and the default mode network in bilingual older adults (Grady et al., 2015).
- Recent structural studies have revealed **higher fractional anisotropy (FA) values** for bilingual adults in several white matter tracts previously hypothesized to subserved language processing (Pliatsikas, Moschopoulou, E., & Saddy, J.D., 2015). Specifically, previous findings have reported higher FA values for bilinguals in the corpus callosum, extending both posteriorly in the bilateral longitudinal fasciculi and anteriorly in the right inferior fronto-occipital fasciculus and uncinate fasciculus (Luk et al., 2011; Gold et al., 2013; Pliatsikas, et al., 2015).

Studies in Clinical Populations

- **Alzheimer's disease:** Recent findings suggest that bilingualism delays the onset of highly prevalent neurocognitive disorders, such as Alzheimer's disease, by approximately 4 years, despite the presence of greater neuropathology and white matter integrity deterioration (Craik, Bialystok, & Freedman, 2010; Gollan, Salmon, Montoya & Galasko, 2011; Schweizer, Ware, Fischer, Craik & Bialystok, 2012).
- **Stroke:** A large proportion of bilingual adults (~40.5%) showed "within normal limits" general cognitive abilities approximately 7 months post-stroke (Alladi et al., 2016).
- **Epilepsy:** Bilingual adults diagnosed with epilepsy showed comparable performance on executive functioning to monolingual adults with epilepsy despite lower ipsilateral frontal lobe white matter integrity (Reyes et al., 2018).

Limitations

- Methodological inconsistencies, primarily driven by the definition of bilingualism and how it's measured in each study. The literature to-date has highlighted several caveats in the operationalization of bilingualism (Calvo et al., 2016) as many studies have relied on unreliable subjective interviews where the participant enumerates the languages she/he knows and self-rates her/his proficiency. These studies, therefore, transform the qualitative information into a binary variable capturing whether a person is bilingual or not.
- Researchers utilized cognitive tools validated in largely educated monolingual and monolingual normative samples, thus not readily accounting for the effects of culture and language related factor altering typically known brain-behavior relationships.

Degree of Bilingualism

- English to Spanish Fluency Ratio (Suarez et al., 2014)
  - Controlled Oral Word Association Test
    - English: F-A-S
    - Spanish: P-M-R
  - Relative English Fluency Ratio: Number of English word out of total words
    - FAS/(FAS+PMR)

Degree of Bilingualism: Effect on Neuropsychological Performance

- Monolinguals
  - Individuals who have ratio scores below 0.33 are considered monolingual Spanish-speakers
- Bilinguals
  - Individuals with ratio scores between 0.40 and 0.60 are considered bilinguals
- English-dominant
  - Individuals with ratio scores equal or above 0.61 were excluded from the study
- Other exclusions:
  - Cases with values borderline those of monolingual Spanish speakers (.34-.39) and bilinguals

Findings: Where bilingual disadvantages where expected

Neuropsychological Test	Bilingual Advantage	Bilingual Disadvantage
VERBAL		
WAIS-R Vocabulary		+
Category Fluency		+
Boston Naming Test		+

Findings: Where bilingual advantages where expected

Neuropsychological Test	Bilingual Advantage	Bilingual Disadvantage
EXECUTIVE/ABSTRACTION		
Trails Making Test B	+	
WCST-Total errors	+	
WCST-Perserverative errors	+	
Halstead Category Test-Total errors	?+	
Stroop Test-Color/Word	+	
ATTENTION/WORKING MEMORY		
WAIS-III Letter Number Sequencing	+	
PASAT-Total correct	+	
WAIS-R Arithmetic	?+	
WAIS-R Digit Span	+	

Findings: Where no differences where expected

Neuropsychological Test	Bilingual Advantage	Bilingual Disadvantage
LEARNING		
SVLT-Learning	**?+**	
Figure Learning	=	=
Story Learning	=	=
MEMORY		
SVLT Short Delay Free Recall	=	=
SVLT Long Delay Free Recall	=	=

Findings: Where no differences where expected

Neuropsychological Test	Bilingual Advantage	Bilingual Disadvantage
PSYCHOMOTOR SPEED		
WAIS III- Digit Symbol	=	=
WAIS III-Symbol Search	=	=
Trail Making Test A	=	=
Stroop Test-Read	=	=
Stroop Test-Color	=	=
VISUOSPATIAL SKILLS		
Block Design	=	=
MOTOR ABILITIES		
Finger Tapping-Dominant Hand	=	=
Finger Tapping-Non Dominant Hand	=	=
Grooved Pegboard-Dominant Hand	=	=
Grooved Pegboard-Non Dominant Hand	=	=

CNP Translating Science into Practice: Language Proficiency and Fluency

- In the absence of a gold standard for testing bilingual patients, we, at the CNP, we take a systematic approach to determine a person's fluency and proficiency to then determine the language of testing in bilingual individuals.
- Operationalize degree of bilingualism to guide course of assessment
  - Language use and generativity (phonemic & semantic fluency)
  - Linguistic Proficiency (BVAT, W-J TOL)
    - Based on WJ-R: Picture Vocabulary, Oral Vocabulary, and Verbal Analogies
    - Clinical distinction between:
      - Basic Interpersonal Communication Skills (BICS)
      - Cognitive and Academic Language Proficiency Skills (CALPS)

Neuropsychological Assessments from a Bilingual and Bicultural Empirically-based Framework

- We selected four cases seen at CNI that best illustrate the improvements in diagnostic outcomes and treatment recommendations that result from using a systematic bilingual and bicultural assessment model, relative to the mainstream monolingual and monocultural model. We selected cases across the lifespan, with different degrees of bilingualism, different immigration experiences, and with different etiological considerations to illustrate the utility of using this assessment model.

	Geriatric Neurology	Behavioral Neurology	Adult Psychiatry	Pediatric Forensic
Age	85	50	50	15
Gender	Female	Male	Female	Male
Years of Education	Bachelor's	Middle School	Bachelor's	High School
Referral Question	Dementia	Pre-surgical evaluation for epilepsy	Memory decline	Independent Educational Evaluation (IEE)

Diaz-Santos et al. Submitted to TCN

Case #2: Epilepsy

- A 50-year old right handed Spanish-dominant bilingual gentleman with medically refractory seizures since early adolescence was referred to his third neuropsychological assessment as part of his pre-surgical candidacy evaluation.

Monolingual Approach:	Bilingual Approach:
The patient was interviewed in English and assessed with neuropsychological tools validated with monolingual and monocultural normative samples.	The patient bilingual proficiency and fluency were objectively assessed with validated neuropsychological/academic measures.
Previous provider made a comment in the reports about the potential contribution of English as a Second Language (ESL) to the neurocognitive profile. However, the neurobiology of bilingualism and its neurocognitive correlates was not systematically incorporated in the assessment.	Systematically assessed the role of linguistic discrimination as the underlying cultural nuance driving the patient's desire to be evaluated in English-only. Provided evidenced-based psychoeducation on the importance of a bilingual assessment in diagnostic specificity and sensitivity in the epilepsy setting.
The neurosurgical team denoted the patient's lack of candidacy for resective surgery due to the presence of multiple epileptogenic foci suggested by his complex neuropsychological profiles.	Compared with the other two evaluations, the bilingual assessment showed a different pattern of neurocognitive strengths and weaknesses more consistent with a more profound non-dominant hemispheric lateralized profile compared to a more recent decline in functions subserved by the language-dominant hemisphere. Continual seizing propagation overtime likely subserved the current complex neurocognitive and neuropsychiatric profile. His complex presentation at this point of time (several years after initial monolingual evaluation) further reduced the patient's candidacy for resective surgery.

Psychoeducation Section: Summary

- Implementation of a bilingual and bicultural neuropsychology model
  - Assess the patient's bilingual fluency with empirically-based fluency/proficiency assessments
  - Systematically incorporate brain-behavior principles with the currently known and evolving literature on bilingualism
  - Reduce discrepancies in diagnosis and treatment planning when evaluating a bilingual and bicultural individual

Q & A

Psychoeducation Section

Application Section

Case Presentation
Emic vs. Etic
Language Proficiency & Fluency
Neuropsychological Tool Selection
Neuropsychological Profile Analysis
Diagnostic Formation and Treatment Recommendations

Case Presentation

- Reason for Referral
  - Background Information
    - Patient is a 3X-year old, married, right handed, bilingual (Spanish-English) Latina with 16 years of education.
  - Medical History
    - Profound history of simple-partial seizures, complex-partial seizures and generalized tonic-clonic seizures.
    - Epileptogenic foci is hypothesized to originate from right temporal structures.

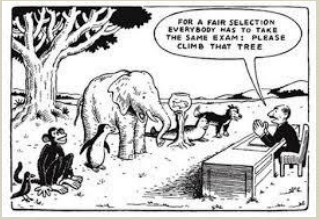
Etic vs. Emic

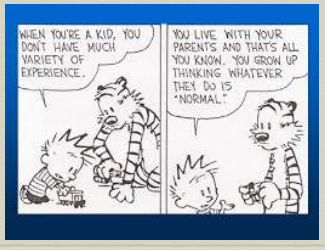
Clinical Interview Approach

"*What bilinguals do depends on what kind of bilinguals they are.*"

Terms borrowed from… Linguistics & Anthropology

- Phon-etics: the universal characteristics of sounds in a language
- Phon-emics: linguistic elements which have meanings in a given language
- Etic: Outsider perspective, "objective," universal, nomothetic
- Emic: Insider perspective, "subjective," relative, ideographic





Etic vs. Emic Interviewing Approach in SRN

- The point of departure for a clinical interview is different when both interlocutors share a more culturally congruent (i.e., Emic) orientation
- Linguistic discordance automatically creates an Etic dynamic
- The bicultural interviewer can more easily shift between an etic and emic lens to facilitate eliciting complimentary/clarifying information
- Cultural humility reins-in both Etic and Emic bias and over-correction
- The cultural and linguistics characteristics of the interviewer can be reconceptualized as unique and orthogonal skills and competencies which have a direct impact on the information elicited and disclosed by the interviewee

Background Information
Etic

- **History of Seizure Semiology**:
  - Onset "*reportedly*" at age 20s: Mixture of strong emotions followed by a strong headache (simple partial seizure)
  - First generalized tonic-clonic seizure a few months later
    - Panic attacks
    - → Found Unconscious
    - → Hospitalization
  - Onset of complex partial seizures a few years later
  - Absence seizures observed by others
- **Imaging:**
  - Atypical form of mesial temporal lobe epilepsy (right amygdala/hippocampus)
- **Relevant Medical/Psychiatry History:**
  - Past: Involved in car accident as a child, and food poisoning
  - Current: Decreased Vitamin D, & Lamitrigine. Increased Total CO2, & Glucose.
  - History of panic attacks as a child
- **Current Complaints:**
  - Learning and retrieval changes, including learning new faces
  - No language changes
  - Mild changes in attention, concentration, and multi-tasking
  - Increase irritability and impulsivity
  - Decrease libido

Background Information
Emic

Culture

- Country of Origin
- Education & SES
  - Quality of Education
  - Access to Resources
- Immigration History
  - Age of Immigration
  - Reason for Immigration
- Acculturation & Stress

Language

- Age of Acquisition
- Language exposure
- Language use
- Language proficiency
- Quantum of Switching
  - Language switching and control

Neuropsychological Test Selection

CNP Neuropsychological Tools Table (Handout)
Assessment of Language Proficiency and Fluency
Selected Neuropsychological Protocol

Assessment of Language Proficiency and Fluency

Selected Neuropsychological Protocol

- **Global Mental Status**
  - MoCA
- **General Intellectual Functioning**
  - Batería III Achievement Tests
  - Raven Progressive Matrices
- **Attention/Concentration, Processing Speed, Working Memory**
  - BNE Digit Span
  - BNE Stroop Test
  - EIWA Digit Symbol
  - Color Trails 1
  - DKEFS – Trail Making Test (Visual Scanning)
- **Verbal Functioning**
  - Pontón-Satz BNT
  - Examen de Afasia Multilingue (Token Test, Sentence Repetition)
  - MAE (Sentence Repetition)
- **Visuospatial Functioning**
  - EIWA Block Design
  - NEUROPSI A&M Rey-O Complex Figure
  - Memory for Faces
  - Social Perception
- **Visual Learning & Memory**
  - NEUROPSI A&M Rey-O Complex Figure
  - BVMT-R
  - BNE Visual Reproduction 2
- **Verbal Learning & Memory**
  - BNE Word List
  - BNE Logical Memory
- **Executive Functioning**
  - D-KEFS Design Fluency Test
  - BNE Stroop
  - Color Trails 2
  - WCST Conners CPT 2
- **Motor Functioning**
  - Finger Tapping Test
  - Grooved Pegboard Test
- **Psychosocial Functioning**
  - BDI-II & BAI

Data Results & Interpretation

Analyze a datasheet summary from a bilingual neuropsychological framework

Pattern of Strengths and Weaknesses? Audience Survey

- Lateralized vs. Diffuse Profile?
- Anterior vs. Posterior Profile?
- Mesial Temporal vs. Lateral Temporal?
- Fronto-subcortical profile?

Global Mental Status

General Intellectual Functioning

Attention/Concentration, Processing Speed, Working Memory

Verbal Functioning

Visuospatial Functioning

Visual Learning & Memory

Verbal Learning & Memory

Executive Functioning

Motor Functioning

Social Cognition

Psychosocial Functioning

Pattern of Strengths and Weaknesses

Within or Above Normative Expectation

- Basic auditory attention and working memory (maintenance, manipulation+)
- Processing speed+ (visual-motor integration, visual scanning, color naming)
- Language (confrontation naming+, semantic fluency+, comprehension)
- Visuospatial reasoning (visual abstract reasoning, construction of a complex figure+)
- Memory for visual information+ (simple and complex figures)
- Memory for verbal information (structured and unstructured)
- Executive functioning (novel problem solving, design fluency+, controlled switching+, Inhibiting the prepotent response+)
- Social cognition (affective naming, content of memory for faces)
- Gross motor abilities with both hands (better with the non-dominant hand)

Below Expectation

- Speeded word reading
- Sustained visual attention
- Language retrieval (phonemic fluency in both English and Spanish, and semantic fluency in English)
- First trial learning for verbal unstructured information
- Learning structured verbal material
- Learning for visual information
- Memory for faces (spatial)
- Fine psychomotor speed with both hands

Audience Survey: Part II

- Lateralized vs. Diffused Profile?
- Anterior vs. Posterior Profile?
- Mesial Temporal vs. Lateral Temporal?
- Fronto-subcortical profile?

Diagnostic Formulation

- "Findings are generally consistent with telemetry and imaging studies suggesting right temporal involvement that **does not necessarily appear to be hippocampally mediated storage deficits**, but more encoding deficits related to endfolium sclerosis and/or executive functioning inefficiencies at this time."
- "**Subtle frontal contributions** suggestive of broader limbic seizure activity."
- "Profile is consistent with possible **left-frontal involvement with overall decline in cognition**."
- "Warrants a diagnosis of Mild Cognitive Impairment due to a General Medical Condition at this time."

Recommendations

- **Additional Studies:** Further clarification of functional language organization (*Bernal & Ardila, 2014*).
  - Bilingual WADA procedure
  - Bilingual fMRI

CNP and UCLA Health: Continuity of Care

- **WADA exam:**
  - "Results indicate excellent function of left hippocampus with score of 100% with right sided injection".
  - "1. left hemisphere dominance for language in both English and Spanish following right hemisphere injection. Nonetheless, given that language representation in bilingual individuals can be represented bilaterally, a language fMRI is still recommended.
  - 2. 100% memory with a right hemisphere injection.
  - 3. The results of this WADA suggest left hemisphere dominance for language in both English and Spanish.
  - 4. Given the proposed right hemisphere epileptogenic focus and results of this Wada exam, the patient is not considered to be at increased risk for further postoperative language and memory decline given her demonstrated left hemisphere speech dominance and strong memory function after a right hemisphere injection. These results are consistent with neuropsychological findings of high average to superior verbal memory functioning."

CNP and UCLA Health: Continuity of Care

- Patient underwent a right anteromedial temporal lobectomy and amygdalohippocampectomy. Surgical procedure was unremarkable and post-operative recovery was reportedly uneventful.
- Patient endorsed greater anxiety, worry, and low mood following her surgery. She reported difficulty distinguishing whether the episodes of fear, bodily sensations, and panic are in fact auras, or if they are related to anxiety.

Post-Operative Neuropsychological Evaluation: Continuity of Care

- **Results**
  - Notable circumscribed areas of relative decline:
    - Visual memory and visually-mediated aspects of executive functioning (i.e., encoding deficits)
    - Marked difficulty with organization and planning visual information (location and spatial relationships)
    - Depressed processing speed for visually mediated tasks
    - Mood (apathy and anxiety)
  - Improvements:
    - Qualitative improvement in verbal learning and memory
- **Diagnoses:**
  - Mild Neurocognitive Disorder due to another medical condition
  - Unspecified anxiety disorder vs. "behavioral disturbance" specifier

Summary

- The assessment of bilingual patients is a complex task and one that requires the integration of vital information from both various sources and a flexible approach (i.e., cultural humility) without compromising on assessment fundamentals (i.e., **assessing patients solely in their second language; the sole use of non-verbal neuropsychological measures**).

Overall Discussion

- Cultural neuropsychology, therefore, '*can be defined as the systematic study of brain-behavior relationships within the context of human beings recursively engaging in specific cultural practices that organize the development, maintenance and revision of their cognition and behavior*s' (Cagigas & Manly, 2014, p. 137).
- **Etic + Emic = Clinical (Cultural) Neuropsychology**
  - The application of brain-behavior principles, including experience-induced neuroplasticity research findings (i.e., education, occupation, exercise, *language acquisition and maintenance*)
  - A systematic approach to determine a person's fluency and proficiency to then determine the language of testing in bilingual individuals.
  - Bilingual patients are assessed using a bilingual battery that is tailor to most appropriately answer the referring questions with the goal of providing the best available treatment of care (i.e., sensitivity and specificity of diagnosis; tailored treatment recommendations).

Monolingual vs. Bilingual Neuropsychology Models: Quality of Care

- **Previously Discussed Epilepsy Case:**
  - Compared to his previous two neuropsychological evaluations in English, his neurocognitive profile during our bilingual assessment showed a pattern of neurocognitive strengths and weaknesses consistent with a profound non-dominant hemispheric lateralized profile and a potentially recent decline in functions subserved by the language-dominant hemisphere. Rather than multiple and separate epileptogenic foci as concluded in the previous two neuropsychological evaluations, his third assessment in our clinic suggested that the most notable impairments early on were potentially consistent with non-dominant hemisphere involvement (i.e., visuospatial functions), and that these functions continued to decline over time while dominant hemisphere verbal abilities in English appeared to remain stable over time until now.

Nomological fallacy of Etic clinical nosology

- Daniel Dennett's *Intentional Stance* as a tool for drawing out the Emic to compliment, and in some instances, correct Etic diagnosis
- Culture-bound syndromes and idiosyncratic idioms of distress
- "Lost in translation" vs "Recovered in conversation"
- To what degree should patients and their families be responsible for educating clinicians on who they are and how they communicate?

Q & A

Application Section

Gracias!