Ethnocultural Factors in Clinical AD Phenotype

Monica Rivera-Mindt PhD, ABPP
Fordham University & Icahn School of Medicine at Mount Sinai

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Affiliations
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- Joint Appointment in Neurology, Icahn School of Medicine at Mount Sinai
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Leadership/Advisory
- ALL-FTD External Advisory Board
- Alzheimer’s Association, NYC Chapter Board
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- CDC BOLD Public Health Center of Excellence on Dementia Risk Reduction Expert Panel*
- Harlem Community & Academic Partnership Board (Treasurer)
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- National Centralized Repository for ADRD (NCRAD) Executive Committee
- UC San Francisco Alzheimer’s Disease Research Center (ADRC) Advisory Board
- University of Texas Rio Grand Valley Resource Center for Minority Aging Research Advisory Board
- University of Washington Alzheimer’s Disease Research Center (ADRC) Advisory Board

No Conflicts of Interest
“We acknowledge the people of the Tribal Nations and tribes in New York City (e.g., Lenni Lenape, Cayuga, Mohawk, Erie, Seneca, Oneida), who are the traditional custodians of the land on which we work and live, and recognize their continuing connection to the land, water, and air that the United States consumes. We pay respect to their elders past, present, and emerging.”

Consulted by: New York Indian Council, Inc.
Positionality

Axis of Adversity

- Afro-Latinx, Indigenous daughter of immigrants
- 6 of the 7 NIH criteria for "Disadvantaged Background."
  - SES, unstable housing….
- Health: No or inadequate insurance growing up
- Education: ESL until ~3rd grade
- Occupational Exp.: 13 yrs old - started working

Axis of Privilege

- Cis-gender/hetero
- US- born
- Able-bodied
- Education & Training (CBPR)
- Current middle-class status
- *Tremendous* social support
- Temperament to withstand the sociocultural challenges & assaults of academia
Overview

- Context: Demographics & Inequities

- Framework

- Considerations for Clinical AD Phenotyping Across Populations

- Towards Brain Health Equity
  - Gaps & Key Questions
  - Moving Forward
U.S. Demographic Shifts

Distribution of U.S. Population by Race/Ethnicity, 2010 and 2050

- **White, non-Hispanic**
  - 2010: 65%
  - 2050: 46%

- **Black, non-Hispanic**
  - 2010: 16%
  - 2050: 30%

- **Asian**
  - 2010: 12%
  - 2050: 12%

- **Other**
  - 2010: 5%
  - 2050: 8%

**2010 Total = 310.2 million**

**2050 Total = 439.0 million**

NOTES: All racial groups non-Hispanic. Other includes Native Hawaiians and Pacific Islanders, Native Americans/Alaska Natives, and individuals with two or more races. Data do not include residents of Puerto Rico, Guam, the U.S. Virgin Islands, or the Northern Mariana Islands.


Distribution of U.S. Population by Race/Ethnicity, 2010 and 2050

- **2010**
  - Total = 310.2 million
  - 65% White, non-Hispanic
  - 16% Black, non-Hispanic
  - 5% Asian
  - 2% Other
  - 12% Hispanic

- **2050**
  - Total = 439.0 million
  - 46% White, non-Hispanic
  - 30% Black, non-Hispanic
  - 8% Asian
  - 4% Other
  - 12% Hispanic

**Notes:**
- All racial groups non-Hispanic. Other includes Native Hawaiians and Pacific Islanders, Native Americans/Alaska Natives, and individuals with two or more races. Data do not include residents of Puerto Rico, Guam, the U.S. Virgin Islands, or the Northern Mariana Islands.

1. Administration on Aging (2009)
Context of Disadvantage: Inequities in Brain Health

- Black & Latinx older adults are up to **3x** as likely to develop AD than non-Latinx white adults* 2,3
- **Younger age of onset**2,3
- **Greater severity of initial AD symptoms**2,3

*Note. Research based on primarily older adults (65+ yrs).


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1. **English** only – 239 million
2. **Spanish** – 41 million
3. **Chinese** (including Mandarin and Cantonese) – 3.5 million
4. **Tagalog** (including Filipino) – 1.7 million
5. **Vietnamese** – 1.5 million
6. **Arabic** – 1.2 million
7. **French** – 1.2 million
8. **Korean** – 1.1 million
9. **Russian** – 0.94 million
10. **German** – 0.92 million

https://www.usagainstalzheimers.org/learn/disparities
Context of Disadvantage: Inequities in Dementia Care

Older Black and Latinx Adults 65+ yrs

- 30-40% less likely to access outpatient neurology care than non-Latinx whites\textsuperscript{4,5}

- More likely to receive care in the ER, with longer hospital stays and higher inpatient costs, after neurologic diagnosis. \textsuperscript{4,5}

Older Black and Latinx Adults < 65 yrs

Overview

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Culturally-Informed, Evidence-Based Clinical AD Phenotyping in a Biopsychosociocultural Framework

Cognition

Emotion

Behavior

Biological

Socio-cultural

Structural/Systemic

Culturally-Informed, Evidence-Based Clinical AD Phenotyping in a Biopsychosociocultural Framework

GENETIC FACTORS

**APOE ε4**
- ✗ Caribbean
- ✗ Mexican

**PSEN 1**
- ✔ Caribbean
- ✔ Mexican
- ✔ Colombian

**PSEN 2**
- ✔ Caribbean

O'Bryant et al., 2013a; O'Bryant et al., 2013b; Reitz et al., 2014; Vega et al., 2017
Culturally-Informed, Evidence-Based Clinical AD Phenotyping in a Biopsychosociocultural Framework

By 2050, Latinos and African-Americans will make up nearly 40% of the 11.4 million American families affected by Alzheimer's disease.

Cognitive tests are key tools for clinical AD phenotyping.

Yet, misclassification risk is high w/out a culturally-informed, evidence-based approach.

Heaton & Taylor, 2001

Modified slide courtesy A. Thames
Precision Normative Data is Necessary, But Not Sufficient for Precision AD Phenotyping

-Brickman et al., 2006

Neuropsychology’s race problem does not begin or end with demographically adjusted norms

Desiree A. Byrd1,2,4,5,6,7 and Monica G. Rivera-Mindrila1,2,4,5,6,7

Demographically adjusted norms that include sociocultural factors such as race can provide an evidence-based approach for addressing the chronic systemic and diagnostic inequities in the interpretation of neuropsychological tests. However, these norms have important limitations, and more work is needed to improve the diagnostic validity of neuropsychological assessments in diverse populations.

In the USA, a national controversy has emerged over what to bring to a race-based normative process in neuropsychology, whereas scores from neuropsychological tests are interpreted according to a person's racial identification. As with many scientific issues that gain media attention, coverage of this topic has been decidedly unbalanced and decontextualized. The most widely promoted position has been the stance against these demographically adjusted norms (for example, race, ethnicity, education, and gender) with accusations that assessment, gain an enhanced appreciation for the complexities of ethnic/racial differences, and imagine the equitable systemic changes that would eliminate the need for them. Of note, this article includes abbreviated summaries of professional practices with the aim of provoking readers with foundational information to allow more informed consideration of the points and opinions contained within this Comment. Although the word limit necessitates the use of more generalizations than details herein, we encourage readers to immerse themselves in the issues on a

Key Issues
- Time in history norms were created
- Adequate normative sample size
- Normative data are appropriately stratified in ways that best capture demographic factors that contribute to test performance.
Culturally-Informed, Evidence-Based Clinical AD Phenotyping in a Biopsychosociocultural Framework

Ethnocultural Differences in Depressive Symptoms’ Relationship to Cognition

Depressive Symptoms Differentially Predict Neurocognition in Latinx and non-Hispanic White People Living with HIV

Emily P. Morris¹, Desiree Byrd²,³,⁴, Angela C. Summers²,⁵, Kayla Tureson⁶, Vanessa Guzman⁷, Cara L. Crook²,⁵, Monica Rivera Mindi²,³,⁵

BDI-II Item Categorization

<table>
<thead>
<tr>
<th>Cognitive/Affective</th>
<th>Somatic/Functional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sadness (Item 1)</td>
<td>Guilty Feelings (Item 5)</td>
</tr>
<tr>
<td>Pessimism (Item 2)</td>
<td>Punishment Feelings (Item 6)</td>
</tr>
<tr>
<td>Past Failure (Item 3)</td>
<td>Crying (Item 10)</td>
</tr>
<tr>
<td>Loss of Pleasure (Item 4)</td>
<td>Agitation (Item 11)</td>
</tr>
<tr>
<td>Self-Dislike (Item 7)</td>
<td>Loss of Interest (Item 12)</td>
</tr>
<tr>
<td>Self-Criticalness (Item 8)</td>
<td>Indecisiveness (Item 13)</td>
</tr>
<tr>
<td>Suicidal Thoughts or Wishes (Item 9)</td>
<td>Worthlessness (Item 14)</td>
</tr>
<tr>
<td>Loss of Energy (Item 15)</td>
<td>Changes in Sleeping Pattern (Item 16)</td>
</tr>
<tr>
<td>Changes in Appetite (Item 18)</td>
<td>Concentration Difficulty (Item 19)</td>
</tr>
<tr>
<td>Tiredness or Fatigue (Item 20)</td>
<td>Loss of Interest in Sex (Item 21)</td>
</tr>
</tbody>
</table>

Linear Regressions Predicting Global and Neurocognitive Domain Function BDI-FS and BDI-NFS in the Latinx Group (N = 100)

<table>
<thead>
<tr>
<th>Neurocognitive Domain</th>
<th>Full Model R²</th>
<th>Full Model F (df)</th>
<th>P</th>
<th>BDI-FS β (SE)</th>
<th>P</th>
<th>BDI-NFS β (SE)</th>
<th>P</th>
<th>WTAR β (SE)</th>
<th>P</th>
<th>Detectable VL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Functioning</td>
<td>.16</td>
<td>6.93 (3.94)</td>
<td>&lt;.01</td>
<td>.04 (3.33)</td>
<td>.91</td>
<td>−32 (1.16)</td>
<td>.049 *</td>
<td>.14 (0.04)</td>
<td>.002 **</td>
<td>-</td>
</tr>
<tr>
<td>Motor Functioning</td>
<td>.07</td>
<td>0.06 (2.92)</td>
<td>&lt;.01</td>
<td>1.05 (5.27)</td>
<td>.27</td>
<td>−10 (2.77)</td>
<td>.78</td>
<td>&lt;.001 **</td>
<td>3.74 (2.19)</td>
<td>-</td>
</tr>
<tr>
<td>Processing Speed</td>
<td>.09</td>
<td>5.75 (2.97)</td>
<td>&lt;.01</td>
<td>4.6 (4.46)</td>
<td>.32</td>
<td>−63 (2.22)</td>
<td>.006 **</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Learning</td>
<td>.26</td>
<td>7.66 (4.86)</td>
<td>&lt;.01</td>
<td>−61 (5.55)</td>
<td>.27</td>
<td>−10 (2.77)</td>
<td>.78</td>
<td>2.09 (0.07)</td>
<td>.03 *</td>
<td>-</td>
</tr>
<tr>
<td>Attention/Working Memory</td>
<td>.10</td>
<td>4.32 (3.89)</td>
<td>&lt;.01</td>
<td>−49 (4.41)</td>
<td>.23</td>
<td>−12 (2.20)</td>
<td>.55</td>
<td>.11 (0.05)</td>
<td>.03 *</td>
<td>-</td>
</tr>
<tr>
<td>Memory</td>
<td>.19</td>
<td>4.98 (4.86)</td>
<td>&lt;.01</td>
<td>−60 (5.59)</td>
<td>.31</td>
<td>−77 (2.70)</td>
<td>.79</td>
<td>2.08 (0.07)</td>
<td>&lt;.001 **</td>
<td>-</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>.06</td>
<td>3.15 (3.91)</td>
<td>&lt;.01</td>
<td>−38 (5.57)</td>
<td>.51</td>
<td>−52 (2.28)</td>
<td>.06 **</td>
<td>1.1 (0.07)</td>
<td>.07 f</td>
<td>-</td>
</tr>
<tr>
<td>Executive Functioning</td>
<td>.03</td>
<td>2.63 (2.95)</td>
<td>&lt;.01</td>
<td>−23 (4.49)</td>
<td>.65</td>
<td>−26 (2.25)</td>
<td>.30</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note:

* .05 < P < .10;
** P < .05;
*** P < .01.

BDI-FS = Beck Depression Inventory – Fast Screen; BDI-NFS = Beck Depression Inventory – Non Fast Screen; WTAR = Wide Range Achievement Test; VL = Viral Load.
Culturally-Informed, Evidence-Based Clinical AD Phenotyping in a Biopsychosociocultural Framework


Diagram:
- Biological
- Socio-cultural
- Structural/Systemic
- Cognition
- Emotion
- Behavior

Image: By 2050, Latinos and African Americans will make up nearly 40% of the 1.4 million American families affected by Alzheimer's disease.
Importance of Within-Group Heterogeneity in Clinical AD Phenotyping

**Figure 1.**
Rates of global and domain neurocognitive impairment among HIV+ Latinos and Whites.

*p<0.01  **p<0.001

**Figure 2.**
Rates of global and domain neurocognitive impairment by Latino group (Mexican and Puerto Rican origin/descent).

*p<0.01  **p<0.001

Within-Group Differences in Latinx Subgroups

Between-Group Differences in NHW & Latinx Adults

NHW = non-Hispanic white

JINS, Marquine...Rivera Mindt..et al., 2018
Importance of Acculturation in Clinical AD Phenotyping

Table 2. Principal Component Analysis of Variables Reflecting Acculturation in Context (N=199)

<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested in Spanish</td>
<td>0.894</td>
<td>-0.016</td>
<td>-0.002</td>
</tr>
<tr>
<td>Nativity status (non-US)</td>
<td>0.802</td>
<td>-0.127</td>
<td>-0.195</td>
</tr>
<tr>
<td>Parents’ nativity status (both non-US)</td>
<td>0.563</td>
<td>-0.315</td>
<td>-0.356</td>
</tr>
<tr>
<td>SASH social</td>
<td>-0.695</td>
<td>-0.009</td>
<td>-0.070</td>
</tr>
<tr>
<td>SASH language</td>
<td>-0.953</td>
<td>-0.007</td>
<td>-0.006</td>
</tr>
<tr>
<td>SASH total</td>
<td>-0.967</td>
<td>-0.008</td>
<td>-0.025</td>
</tr>
<tr>
<td>Self-report of discrimination</td>
<td>0.004</td>
<td>0.665</td>
<td>0.101</td>
</tr>
<tr>
<td>Social network</td>
<td>0.011</td>
<td>-0.664</td>
<td>0.437</td>
</tr>
<tr>
<td>Social isolation</td>
<td>0.395</td>
<td>0.711</td>
<td>0.136</td>
</tr>
<tr>
<td>Familism</td>
<td>0.264</td>
<td>-0.014</td>
<td>0.839</td>
</tr>
<tr>
<td>Variance explained</td>
<td>43.136</td>
<td>15.083</td>
<td>10.957</td>
</tr>
</tbody>
</table>

Notes: SASH = Short Acculturation Scale for Hispanics. Factor loadings are unrotated with bold values representing the primary loading for each study variable.

Table 3. Correlation of Potential Covariates, Predictors, and Global Cognitive Outcome

<table>
<thead>
<tr>
<th></th>
<th>Acculturation-related composite</th>
<th>Contextually-related composite</th>
<th>Familism</th>
<th>Global cognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative vascular disease burden</td>
<td>-0.01 (.85)</td>
<td>-0.12 (.07)</td>
<td>-0.005 (.95)</td>
<td>0.004 (.94)</td>
</tr>
<tr>
<td>Cumulative CVD risk factors</td>
<td>-0.11 (.12)</td>
<td>0.06 (.40)</td>
<td>0.07 (.35)</td>
<td>-0.18 (.009)</td>
</tr>
<tr>
<td>Body mass index</td>
<td>-0.06 (.39)</td>
<td>-0.03 (.60)</td>
<td>0.03 (.60)</td>
<td>-0.05 (.47)</td>
</tr>
<tr>
<td>CES-D</td>
<td>-0.04 (.57)</td>
<td>0.44 (.0001)</td>
<td>-0.09 (.28)</td>
<td>-0.25 (.0004)</td>
</tr>
<tr>
<td>Income</td>
<td>0.31 (.0001)</td>
<td>-0.34 (.0001)</td>
<td>-0.11 (.20)</td>
<td>0.39 (.0001)</td>
</tr>
</tbody>
</table>

Notes: CES-D = Center for Epidemiological Studies-Depression; CVD = cardiovascular disease. Values are Pearson correlation coefficient (p value) with the exception of the Spearman correlation coefficient (p value) for analyses involving income. Bolded values met significance set at p < .05.
Socioeconomic Status

Adult SES (Hollingshead) mediated the relationship between ethnicity w/ Learning & Memory.

Learning: ISP $R^2 \Delta = .08, \beta = .30, SE \beta = .09, p < .01, \text{ ethnicity ns}$

Memory: ISP $R^2 \Delta = .09, \beta = .34, SE \beta = .10, p < .01, \text{ ethnicity ns}$
Greater Discrimination Associated with Greater Amygdala rsFC with Several Brain Regions in SN*

Analyses controlled for current levels of stress, depression, anxiety, and PTSD-related symptoms.

*SN=Salient Network; FWE=family wise error

Slide Courtesy Dr. U. Clark; Clark et al., 2018
Perceived Discrimination & Stereotype Threat

N = 92 adults
- African American (n = 45)
- non-Hispanic white (n = 47)

Randomly assigned to stereotype threat or non-threat condition; then, same race or different race examiner.

Effects of Stereotype Threat, Perceived Discrimination, and Examiner Race on Neuropsychological Performance: Simple as Black and White?

April D. Thames,1 Charles H. Hinkin,1,2 Desiree A. Byrd,3 Robert M. Bilder,1 Kimberley J. Duff,1
Monica Rivera Mink,1,4 Alyssa Aretoni,1,2 and Vanessa Steff2

1Department of Psychiatry and Biobehavioral Sciences, University of California Los Angeles, Los Angeles, California
2Department of Psychology, Greater Los Angeles VA Healthcare System, Los Angeles, California
3Department of Neurology and Psychiatry, Mount Sinai School of Medicine, New York, New York
4Department of Psychology, Citytech College, New York, New York

(Rceived September 17, 2012; Final Revision January 4, 2013; Accepted January 7, 2013; First Published Online February 7, 2013)

Fig. 1. Interaction between examinee race and experimental condition interaction on global neuropsychological performance. Error bars represent standard error.

Fig. 2. Interaction between perceived discrimination and examiner race on learning/memory performance in African Americans (n = 45). Error bars represent standard error.

it is critical that interpretations of test performance account
Culturally-Informed, Evidence-Based Clinical AD Phenotyping in a Biopsychosociocultural Framework

Structural Racism in Assessment

COMMENTARY

Creating an Antiracist Psychology by Addressing Professional Complicity in Psychological Assessment

Desiree A. Byrd¹, ², Monica M. Rivera Mindt², ³, Uraina S. Clark², ⁴, Yusuf Clarke², April D. Thames⁵, Emnet Z. Gammada¹, ⁶, and Jennifer J. Manly⁷

*Co-1st Authors
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  ▪ Gaps & Key Questions
  ▪ Moving Forward
Brain Health Equity in AD & Related Dementias

The fair distribution of brain health determinants, outcomes, and resources within and between segments of the population, regardless of social standing.

-Modified from CDC definition of Health Equity
Risk Factors for Cognitive Impairment (CI) & Dementia in Older Black & Latinx Adults (65+ yrs)

**Biological Risk Factors**
- Diabetes
- Hypertension
- Comorbid Conditions (e.g., TBI, HIV)

**Psychological Risk Factors**
- Depression (Cultural diffs)
- Stress (Early life, current)
- Social Isolation

**Sociocultural & Structural Risk Factors**
- Racism/Discrimination
- Cultural Exposures
- SES & Healthcare Barriers
- Quality of Ed/Literacy
- Environmental Exposures

Increased Risk for CI/Dementia

Resilience Factors for Cognitive Impairment (CI) & Dementia within the Context of Disadvantage in Minoritized Populations?

**Biological Resilience Factors**
- Genetics (APOE-4 diffs)?^{3,20}
- Physical Activity (dancing, sports)^{21}
- Addressing Food Insecurity^{22}

**Psychological Resilience Factors**
- Familismo?^{23}

**Sociocultural & Structural Resilience Factors**
- Acculturation?^{15}
- Bilingualism?^{24}
- Social & Health Policies?
  (Discrimination, Educ., Medicaid)^{17,25}

Decreased Risk for CI/Dementia?

Gaps & Key Next Steps

Gaps:
- Sociocultural level factors
  - Cultural Factors
    - Acculturation, within-group variance, culturally-mediated health beliefs/attitudes
  - Intersectionality
    - Dimensions of diversity; e.g., ethnocultural status, religion, gender/gender identity, rurality, poverty, immigration status, region, ability status
  - Discrimination/Persecution due to any individual- or contextual-level factor (see above)

Key Next Steps:
- Flipping our lens from a Deficit Model to an Empowerment & Resilience Model of Brain Health
- Authentic community-engagement & inclusion in AD & dementia research
- Moving beyond pan-ethnicity to mechanisms of resilience & change
- Implementation through public health settings and policies
Towards Brain Health Equity
NYC Collaborators & Lab Members
Drs. D. Byrd, Cham, C., U. Clark, A. Federman, J. Helcer
Becker, T. Hedden, A. Kumar, G. Pandey, J. Robinson-Papp, J.
Wisnivesky

*Gratitude*

M. Aghvinian, A. Camuy, E. Breen, S. Deng, D. Oleas, M. Savin,
A. Slaughter, J. Stiver, L. Schuck, S. Talavera, D. Zhu, & our
awesome alumni!
(AA, MAR, FA, AF, KF, VG, EPM, JPO, PS, RR,
TSS, ACS, KT & more!)

National Collaborators
M. Ashford, A. Boxer, M. Carrillo, C. Conti, G. Coker, H. Heurer,
C. Hill, M. Marquine, R. Nosheny, O. Okonkwo, G. Rabinovici,

The Alzheimer’s Association recommends the following actions to address
discrimination and bias:
- Prepare providers to care for a racially and ethnically diverse population
  of older adults
- Increase diversity in dementia care
- Increase diversity of participants for research and clinical trials

The report stresses that health care providers and researchers must remain
committed to addressing these disparities for older adults. It recommends
actions be taken to ensure the burden of Alzheimer’s disease and dementia is not
made worse by discrimination and unequal access to health care.
Thank you!  
*  
¡Muchas Gracias!  

Questions?  
@DrRiveraMindt
Linguistic Diversity in the U.S.

~21% of the US population speaks a language other than English

Top 10 Languages spoken in U.S.

1. English only – 239 million
2. Spanish – 41 million
3. Chinese (including Mandarin and Cantonese) – 3.5 million
4. Tagalog (including Filipino) – 1.7 million
5. Vietnamese – 1.5 million
6. Arabic – 1.2 million
7. French – 1.2 million
8. Korean – 1.1 million
9. Russian – 0.94 million
10. German – 0.92 million

American Community Survey (ACS); US Census Bureau, 2015
Health Inequities

**Definition**

- A particular type of health difference that is **closely linked with social, economic, and/or environmental disadvantage**.

- Adversely affect **groups of people who have systematically experienced greater obstacles to health** based on.....characteristics historically linked to discrimination or exclusion (e.g., race; ethnicity; SES; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation).

**Exemplars**


- **Perceived Discrimination & Stigma**: ↑ risk for psychiatric morbidity & substance use in LBGT persons, particularly LGBT youth (McCabe et al, 2010; Lehavot & Simoni, 2011).

- **Acculturation Stress**: Related to substance dependence & anxiety disorders (Ehlers et al, 2009).
