Measurement issues in the HCHS/SOL and the HCHS/SOL Sociocultural Ancillary Study

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SOL Sociocultural Aims

Primary Aim 1. To examine the extent to which unique indicators of sociocultural risk and resilience are associated with cardiovascular disease (CVD) prevalence and risk (metabolic syndrome & components).

Primary Aim 2. Guided by an integrative conceptual model, to systematically and simultaneously examine the relative contributions of multiple sociocultural risk and resilient factors to CVD prevalence and risk using structural equation modeling (SEM).

Secondary Aim. To determine the psychometric properties of sociocultural measures, by examining their reliability, factor structure, and invariance (across language versions, also background group)

Psychometric Analyses

- Step 1: Internal Consistency Reliability (Cronbach's Alpha): Are items within a scale or subscale intercorrelated? (Items measuring the same construct should be intercorrelated; higher = more reliable)
- Step 2: Factor Structure: Is the proposed factor structure supported? (e.g., Does the scale consist of 1 factor, or 4?)
- Step 3: Configural Invariance: Is the factor structure equivalent across multiple groups (language or background groups)?

  Are we are assessing the same construct/s in both English and Spanish speakers?

Psychometric Analyses

- Step 1: Examined internal consistency (α)
  - For each full measure and individual subscales, if applicable
  - For full sample and for English and Spanish language samples separately

Minimum Criterion for Adequate Reliability:
Cronbach's $\alpha > .70$ (lower may be OK if small number of items or dichotomous response format)

Psychometric Analyses

- Step 2: Examine factor structure of each measure using Confirmatory Factor Analysis (CFAs)
- Step 3: Test factor structure in each language group and perform multi-group CFAs to examine equivalence of factor structure across Spanish and English samples

Minimum Criteria for Adequate Factor Structure: Model fit statistics show adequate fit for proposed factor structure overall and in both language structures; factor structure does not differ across language versions.

Psychometric Analyses

- Iterative process
  - If minimum criteria were not met, then scoring revisions were considered on empirical and conceptual grounds (determined by committee)
  - Additional analyses were performed if measures were revised to test if “new” scale met minimal criteria

Results (Also See Memo)

- Most measures met minimum criteria
  - Includes SASH/Acculturation, CES-D/Depression, STAI/Anxiety
- Some measures have relatively low alphas; this could be noted as a limitation in manuscripts (e.g., FES - family conflict, Spanish; HSI – acculturation stress)
- In some cases, subscales (e.g., ISEL/social support scale) or total scores (e.g., SASH/ acculturation scale) should not be used because results of psychometric analyses do not support their use
- Some measures required scoring revisions to improve psychometric properties (e.g., FES = family cohesion; Machismo)

Results (Also See Scale Memos)

- If suggested revisions were complex, separate memos were written to describe analyses and recommendations
- Sabogal Familism Measure
  - Select items included in the parent study do not form a valid or reliable scale
  - Complete scale in SOL Sociocultural– poor factor structure and 2/3 subscales did not meet invariance criteria; recommend use of revised familial obligations subscale
- SASH – Acculturation Scale
  - Analyses do not support single factor; two subscales (language, socialization) should be used to fully capture acculturation
- Machismo
  - Consists of two subscales (machismo; caballerismo)

Next Steps

- Work with the CC to incorporate scoring revisions for data release
- Determine (with CC, PC, steering) optimal way to communicate measures information (descriptions, scale and scoring revisions, psychometrics) to internal and external investigators
- Analyses for Scale of Ethnic Experience in progress
- Several measurement/validation papers published (ISEL, Merz et al. 2014) or in progress (CES-D, Gonzalez et al., in preparation; SASH, Navas et al., in preparation; FACIT, Brintz et al., in preparation)
  - Include additional analyses, examining test-retest reliability, convergent/divergent validity, additional tests of invariance

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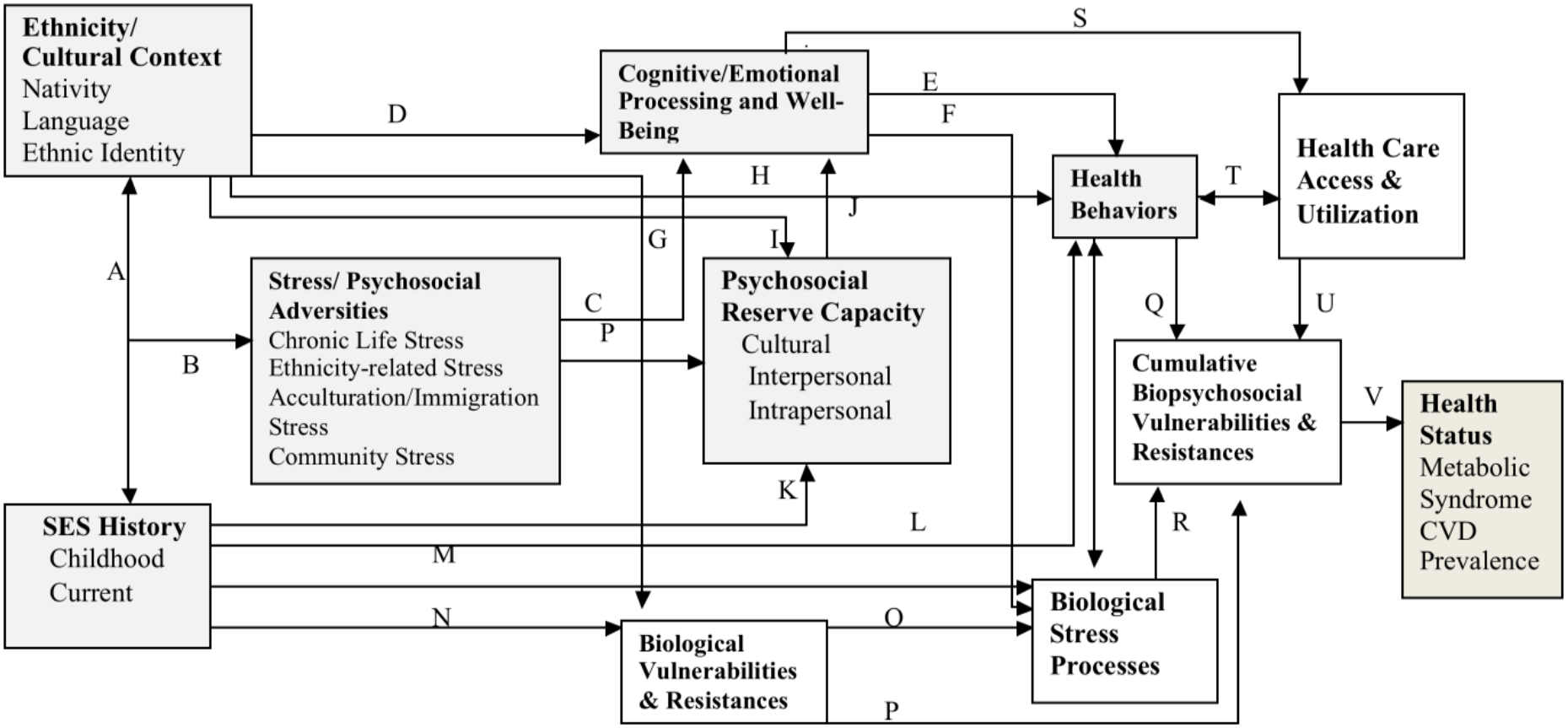
Internal Consistency vs. CFA Model Fit

- When model fit is poor but Cronbach's alpha is high:
  - High coefficient alpha is necessary but not sufficient to show unidimensionality
  - For measures with orthogonal dimensions, alpha for the overall measure can be low (= subscales) but can also be high (if many items)

- When model fit is good but Cronbach's alpha is low:
  - Good model fit indicates that the specified factor structure is supported by the data
  - A one-factor CFA can result in good model fit because the items do not group into more than one factor, but they may not be strongly inter-correlated, resulting in poor internal consistency
  - Or, the scale may have very few items

Figure 1. Integrated Model of Cumulative Risk and Resiliency Processes in MS & CVD Prevalence



- Complex relationships between race/ethnicity and SES on psychosocial adversities, reserve capacity and cumulative vulnerabilities in predicting MS and CVD prevalence over the lifespan.

(Meyer, 2009)