

psychiatric disorders, or substance/alcohol use. The final sample included 7,948 monolingual English-speaking athletes and 7,938 bilingual English- and Spanish-speaking athletes with valid baseline assessments. Language variables were based on self-report. As the number of monolingual athletes was substantially larger than the number of bilingual athletes, monolingual athletes were randomly selected from a larger sample to match the bilingual athletes on age, sex, and sport. Confirmatory factor analysis (CFA) was used to test competing models, including one-factor, two-factor, and three-factor models to determine if a recently identified four-factor model (Visual Memory, Visual Reaction Time, Verbal Memory, Working Memory) provided the best fit of the data. Eighteen subtest scores from ImPACT were used in the CFAs. Through increasingly restrictive multigroup CFAs (MGCFA), configural, metric, scalar, and residual levels of invariance were assessed by language group. **Results:** CFA indicated that the four-factor model provided the best fit in the monolingual and bilingual samples compared to competing models. However, some goodness-of-fit-statistics were below recommended cutoffs, and thus, post-hoc model modifications were made on a theoretical basis and by examination of modification indices. The modified four-factor model had adequate to superior fit and met criteria for all goodness-of-fit indices and was retained as the configural model to test measurement invariance across language groups. MGCFA revealed that residual invariance, the strictest level of invariance, was achieved across groups.

**Conclusions:** This study provides support for a modified four-factor model as estimating the latent structure of ImPACT cognitive scores in monolingual English-speaking and bilingual English- and Spanish-speaking high school athletes at baseline assessment. Results further suggest that differences between monolingual English-speaking and bilingual English- and Spanish-speaking athletes reported in prior ImPACT studies are not caused by measurement error. The reason for these differences remains unclear but are consistent with other studies suggesting monolingual advantages. Given the increase in bilingual individuals in the United States, and among high school athletics, future research should investigate other sources of error such as item bias and predictive validity to further understand

if group differences reflect real differences between these athletes.

**Categories:** Cross Cultural Neuropsychology/  
Clinical Cultural Neuroscience

**Keyword 1:** psychometrics

**Keyword 2:** bilingualism/multilingualism

**Keyword 3:** concussion/ mild traumatic brain injury

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## 19 The Relationship Between Apathy and Cognitive Impairment Among Hispanic/Latin Americans: A Systematic Review

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**Objective:** Evaluate measures used to operationalize apathy in relation to cognitive impairment among Hispanic/Latin Americans and synthesize associations of apathy with cognitive impairment.

**Participants and Methods:** A systematic review of the available literature following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines was conducted. This review covered studies on the relationship between apathy and cognitive impairment among Hispanic/Latin Americans across normal aging and neurocognitive disorders. The first stage of the review consisted of collecting all publications that contained (1) English or Spanish-speaking participants, (2) with measures for reported apathy, (3) assessment of cognitive functioning or diagnosis of neurocognitive disorder, (4) with Hispanic/Latin Americans represented in the sample. There was no limit regarding publication date. The required minimum of H/L participants in selected studies was determined based on a standard of representation in the United States general population, which is around 18.5%. In the second stage of the review, studies were screened excluding all studies that did not meet the criteria.

**Results:** Thirteen, 37, and 17 studies were identified by APA PsychInfo, EMBASE, and PubMed, respectively. After removing 19 duplicate records, 48 reports were then

assessed for eligibility. Thirty-five of those reports were missing apathy and cognition associations, were under-reported in information such as conference abstracts, or were missing adequate representation of H/L participants. This resulted in a total of 13 papers included in this review. Of the eleven cross-sectional studies, nine demonstrated significant differences or associations between apathy and cognitive status, one demonstrated a descriptive difference between apathy and cognitive status (i.e., no hypothesis test conducted), while one demonstrated null effects. All effects suggested that as apathy increased, cognitive impairment increased. These cross-sectional studies spanned across São Paulo, Brazil, Los Angeles, California, West Texas, Cuba, the Dominican Republic, Peru, Venezuela, Mexico, Puerto Rico, and Southwestern United States. This included community and clinic samples of participants. Of the two longitudinal studies, they both demonstrated non-significant associations of apathy and cognitive status. One study in Mexico suggested a risk ratio over 1 where apathy was non-significantly associated with dementia risk, while the other study in Texas, United States had hazard ratios below 1 where apathy was non-significantly associated with mild cognitive impairment risk.

**Conclusions:** The Neuropsychiatric Inventory (NPI) apathy subscale was the most used measure for apathy in this review (81.8% of included studies). However, a recent systematic review on apathy measurement in older adults and people with dementia specifically stated that the apathy dimension commonly used in the NPI should not be employed outside of screening for apathy. This suggests potential bias and poor evidence in the current literature consisting of apathy research with H/Ls. Longitudinal studies evaluating the utility of examining apathy in relation to cognitive impairment with diverse ethnoracial groups, in addition to Hispanic/Latin Americans, are warranted. Assessing construct equivalence of apathy across demographic characteristics such as language, education, and informant characteristics should be conducted to elucidate potential biases in measurement.

**Categories:** Cross Cultural Neuropsychology/  
Clinical Cultural Neuroscience

**Keyword 1:** apathy

**Keyword 2:** cognitive functioning

**Keyword 3:** cross-cultural issues

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## 20 ABCD Study Environmental Correlates of Gray Space on Cognitive Performance Among Youth via NIH Toolbox

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**Objective:** Evidence has shown that the environment is an often overlooked social determinant of health (SDoH) of emotional, neural, and cognitive development. Aspects of the built environment relate to health factors and equity in living conditions, and may contribute to racial, ethnic, or economic health disparities. For example, urbanicity is linked with negative factors including less access to green space (i.e. gray space), increase in air pollution, temperatures, and socio-economic inequalities. While there is existing research on access to green space on some mental health and cognitive outcomes, there is limited research on the presence of gray space linked with cognitive functioning in youth. While some studies have shown that aspects of the neighborhood environment (e.g. access to healthy food, air pollution, heat exposure, and walkability) can impact neural and cognitive functioning, few to date have disentangled unique contributions of these factors in a large, national cohort. Therefore, the aim of the present study was to identify the best fitting model testing multiple SDoHs related to gray space on overall cognitive functioning in youth enrolled in the Adolescent Brain Cognitive Development (ABCD) Study.

**Participants and Methods:** Using baseline data (n = 8,802) from ABCD 4.0 data, this study used environmental measures and linked external databases to characterize SDoH variables predicting youths' cognitive functioning via the NIH Toolbox (e.g. total cognitive composite score). This study used geospatial mapping to estimate exposure to air pollutants and heat. Additionally, the National Walkability Index was linked to assess walkability of neighborhood. Exposure to gray space (e.g. impervious