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Gene, environment and cognitive ability: a Chinese twin aging study

Background: The genetic and environmental contributions to cognitive ability in the older people have been well addressed for the western populations using twin modeling showing moderate to high heritability. No similar study has been conducted in the world largest and rapidly aging Chinese population living under distinct environmental condition as the western populations.

Objective: This study aims at exploring the genetic and environmental impact on normal cognitive aging in the Chinese twins.

Design/Setting: Cognitive ability was measured on 384 complete twin pairs (240 monozygotic and 140 dizygotic pairs) with median age of 50 years (2.5-97.5 percentile: 40-67 years) for 7 items including visuospatial, linguistic skills, naming, memory, attention, abstraction and orientation abilities. Data were analyzed by fitting univariate and bivariate twin models to estimate the genetic and environmental components in the variance and covariance of the cognitive assessments.

Results: Twin correlation on cognitive measurements was low to moderate in monozygotic twins (0.23-0.41, overall 0.42) and low in dizygotic twins (0.05-0.3, overall 0.31) with the former higher than the latter for each item. Estimate for heritability was moderate for overall cognitive function (0.44, 95% CI: 0.34-0.53) and low to moderate for visuospatial, naming, attention and orientation abilities ranging from 0.28 to 0.38. No genetic contribution was estimated to linguistic skill, abstraction and memory which instead were under low to moderate control by shared environmental factors accounting for 23-33% of the total variances. In contrast, all cognitive performances showed moderate to high influences by the unique environmental factors.

Conclusions: Different from the Western countries, genetic factors and common family environment have limited contribution to cognitive function in the Chinese adults. Individual unique environment plays a major role in determining the levels of cognitive performance.

Tuesday 1th July at 14:15-15:15 in room 4.39