Cognitive and non-cognitive factors influencing academic and life outcomes, and normal and pathological aging and the role of intelligence

Raffaella I. Rumiati, SISSA office 341, rumiati@sissa.it, https://insula.sissa.it

The course will be held always online and sometimes also in presence (SISSA, room 139)

Wednesday Oct 7, 11:00-13:00

Introduction to intelligence

a. Early definitions of intelligence: single factor vs multiple factors
b. Construct validity and construct reliability
c. Scientific definitions of intelligence (Francis Galton, James McKeen Cattell, Alfred Binet, Henry Goddard, Lewis Terman, Robert Yerkes)
d. The origin of the Intelligence Quotient (IQ) tests
e. The early tests: Binet and Simon's scales, Stanford-Binet scale, the Alpha and Beta tests

Wednesday Oct 14, 11:00-13:00 (online only)

Testing intelligence

a. Use and misuse of IQ
b. Main IQ tests
c. The Wechsler tests: WAIS and WISC
d. Raven's Matrices
e. Comparing Raven and Wechsler

Wednesday Oct 21, 11:00-13:00

General Intelligence

a. Crystallized (Gc), spatial (Gv) and fluid (Gf) abilities
b. General intelligence (*g*): Spearman's two-factor theory
c. Factor analytic approach
d. Thurstone's primary mental ability
e. Guttman's radix model
f. Gs or speed and efficiency of information processing

Wednesday Oct 28, 11:00-13:00

Rise and fall of intelligence?

a. The Flynn effect: General features
b. Differences in the Flynn effect between verbal and non-verbal tests
c. The stability, development and decline of IQ
d. Cross-sectional studies and longitudinal studies

Wednesday Nov 4, 11:00-13:00

Multiple intelligences

a. Criteria to identify these particular intelligences
b. Intelligences, talents and skills?
c. Independence
d. Against Gardner's theory
e. Signs of intelligence
f. Modularity and localization of function
g. Social intelligence
h. Emotional intelligence

Wednesday Nov 11, 11:00-13:00

Brain & Intelligence

a. Brain size
b. Correlation between head size and IQ
c. Brain size with MR and CT-Scans
d. Neuroanatomical Correlates of Intelligence
e. Global, regional and local findings of tissue-based intelligence correlates
f. Cortical thickness & cortical convolution
g. A distributed brain network for human intelligence
h. A neural basis for general intelligence

Wednesday Nov 18, 11:00-13:00

Intelligence and neuropsychological deficits

a. Brief introduction to neuropsychology
b. Dysexectutive Syndrome
c. Frontal patients' deficits
d. Tests used (Stroop test, Winsconsin Card Sorting Test)
e. Fractioning of frontal functions
f. IQ and frontal lobe
g. Other neuropsychological syndromes with frontal deficits

Wednesday Nov 25, 11:00-13:00

Cognitive capitalism: Factors that can influence intelligence

a. Human capital
b. Educational attainment
c. Socio economic effect (SE)
d. Family background (FB)
e. Social Class
f. Sex
g. Group differences

Wednesday Dec 2, 11:00-13:00

Cognitive and non-cognitive skills

a. Large scale achievement tests
b. Personality: Big Five
c. Other non-cognitive skills

Wednesday Dec 8, 11:00-13:00

Heritability

a. Education and genetics
b. Intelligence and genetics
c. Exceptional accomplishment & expertise

Wednesday Dec 16, 11:00-13:00

Cognitive and brain reserve

a. Normal and pathological ageing
b. Individual differences in tumor patients

Wednesday Dec 23, 11:00-13:00 (online only)

Final test

Essential reading list

Main books

Heckman, J. J., Humphries, J. E., & Kautz, T. (Eds.) (2014). The myth of achievement tests: The GED and the role of character in American life. University of Chicago Press.

Mackintosh, N.J. (2011). IQ and Human Intelligence. Oxford: Oxford University Press, 2nd edition.

Rindermann, H. (2018). Cognitive Capitalism. The Human Capital and the Wellbeing of Nations. Cambridge: Cambridge University Press.

Papers

Barulli, D. & Stern, Y. (2013). Efficiency, capacity, compensation, maintenance, plasticity: emerging concepts in cognitive reserve. *Trends in Cognitive Science*, *17*, 502-9.

Borghans, L., Golsteyn, B. H., Heckman, J. J., & Humphries, J. E. (2016). What grades and achievement tests measure. *Proceedings of the National Academy of Sciences*, *113(47),* 13354-13359. https://doi.org/10.1073/pnas.1601135113

DeYoung, C. G. (2011). Intelligence and personality. In R.J. Sternberg & S.B. Kaufman (Eds.), *The Cambridge Handbook of Intelligence* (pp. 711-737). New York, NY: Cambridge University Press.

Duncan, J. Assem, M. & Shashidhara, S. (in press). Integrated Intelligence from Distributed Brain Activity. *Trends in Cognitive Sciences*.

Jokela, M., Pekkarinen, T., Sarvimäki, M., Terviö, M., & Uusitalo, R. (2017). Trends in economically valuable personality traits. *Proceedings of the National Academy of Sciences*, *114*, 6527-6532.

Rammstedt, B., Danner, D., & Martin, S. (2016). The association between personality and cognitive ability: Going beyond simple effects. *Journal of Research in Personality*, *62*, 39-44. https://doi.org/10.1016/j.jrp.2016.03.005

Rumiati, R., Ciolfi, A., Di Benedetto, A., Sabella, M., Infurna, M. R., Ancaiani, A., & Checchi, D. (2018). Key-competences in higher education as a tool for democracy. *Form@re - Open Journal per la Formazione in Rete, 18(3),* 7–18. https://doi.org/10.13128/formare-24684

Vedel, A. (2016). Big Five personality group differences across academic majors: A systematic review. *Personality and individual differences*, *92*, 1-10. https://doi.org/10.1016/j.paid.2015.12.011

Von Stumm, S., & Ackerman, P. L. (2013). Investment and intellect: A review and meta-analysis. *Psychological Bulletin*, *139(4),* 841–869. https://doi.org/10.1037/a0030746

Wettstein, M., Tauber, B., Kuźma, E., & Wahl, H. W. (2017). The interplay between personality and cognitive ability across 12 years in middle and late adulthood: Evidence for reciprocal associations. *Psychology and Aging*, 32(3), 259. https://doi.org/10.1037/pag0000166