

Study bolsters the special status of the brain's face recognition ability

October 5 2015, by Christopher Packham



(Medical Xpress)—There is seemingly no cognitive load associated with the near-instantaneous recognition of individual faces. Indeed, facial recognition is so innate and so obviously critical to human social exchange that researchers have long hypothesized that this ability has a "special status" independent of general cognitive ability, and that it is likely to be a highly heritable trait.

Many [cognitive abilities](#)—including literacy, spatial reasoning, and mathematical ability—are correlated with general cognitive ability. These traits, along with general cognitive ability, are considered to be heritable and pleiotropic—that is, influenced by a set of common genes. Recent studies involving sets of twins have suggested that face recognition could be an exception to this rule.

For instance, individual differences in face recognition ability were found to be substantially heritable, and phenotypically unrelated to other memory functions, though the sample sizes were too small to establish direct correlations between traits and specific genes. But the strong indications that face recognition is unique, heritable, and unrelated to other cognitive abilities led two researchers at King's College London to conduct a study, reported this month in the *Proceedings of the National Academy of Sciences*, involving a cohort actually large enough to assess the degree to which cognitive abilities are influenced by the same genes.

The researchers recruited over 2100 individual participants still enrolled in the Twins Early Development Study and administered a series of [cognitive tests](#) that included measures of general cognitive ability as well as the standardized Cambridge Face Memory Test (CFMT), which requires participants to memorize a set of unfamiliar faces from images that have been altered to remove details like hair styles that could conceivably leverage other cognitive processing functions, such as [object recognition](#). Such a large sample size enabled an analysis of correlations that indicate pleiotropy.

The researchers demonstrated for the first time that the heritability of face recognition ability is due to specific genetic influences that are not shared with general intelligence or general cognitive ability. "Facial recognition was phenotypically correlated only quite modestly with general object recognition (0.29) and very modestly with general cognitive ability (0.16), as indexed by these measures," the authors write.

This complicated the analysis somewhat, since face recognition does have some small correlation with these other [cognitive traits](#). Thus, as measured by the current study, face recognition does seem to fall within the traditional cognitive hierarchy, at least to a small degree. However, the authors note, "since general cognitive ability usually accounts for a large proportion of the genetic variance within any specific cognitive

domain, this finding offers support for the special nature of faces."

Nonetheless, the results are striking, strongly supporting the argument that face recognition is genetically independent of general cognitive ability and also from traits that derive from it, such as object recognition. This lends weight to the argument that the strong heritability of [face recognition](#) derives from a unique, distinct set of genes that are not correlated with other cognitive abilities.

More information: "Genetic specificity of face recognition." *PNAS* 2015; published ahead of print September 28, 2015, [DOI: 10.1073/pnas.1421881112](#)

Abstract

Specific cognitive abilities in diverse domains are typically found to be highly heritable and substantially correlated with general cognitive ability (g), both phenotypically and genetically. Recent twin studies have found the ability to memorize and recognize faces to be an exception, being similarly heritable but phenotypically substantially uncorrelated both with g and with general object recognition. However, the genetic relationships between face recognition and other abilities (the extent to which they share a common genetic etiology) cannot be determined from phenotypic associations. In this, to our knowledge, first study of the genetic associations between face recognition and other domains, 2,000 18- and 19-year-old United Kingdom twins completed tests assessing their face recognition, object recognition, and general cognitive abilities. Results confirmed the substantial heritability of face recognition (61%), and multivariate genetic analyses found that most of this genetic influence is unique and not shared with other cognitive abilities.

Citation: Study bolsters the special status of the brain's face recognition ability (2015, October 5)
retrieved 25 April 2024 from

<https://medicalxpress.com/news/2015-10-bolsters-special-status-brain-recognition.html>

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