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# Not All Risks Are Created Equal

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Risks of different types (natural, social, moral, recreational, etc.) have been a driving force behind human evolution and development. Working with international collaborators, WANG Xiaotian from the University of South Dakota and LI Shu's group from the Key Laboratory of Behavioral Sciences of the Institute of Psychology, CAS have explored the genetic and environmental influences on human risk taking in different task domains.

To develop a valid tool for measuring individual differences in risk-taking propensity involving both evolutionarily typical and modern risks, the researchers came up with a synthetic scale based on the results of factor analyses and validly tests. The end product is a Domain-Specific Risk-Taking Scale across Seven Domains (DOSPERT-7): cooperation/competition, safety, reproduction, natural/physical risk, moral risk, financial risk, and gambling.

Then they conducted a twin study with a total of 240 same-sex twin pairs (108 female pairs and 132 male pairs) sampled from the Beijing Twin Study (BeTwiSt) registry. Using the DOSPERT-7 the researchers estimated genetic and environmental influences on individual differences in risk-taking propensity over the seven domains. The effects on risk propensity were partitioned into four components: additive genetic (A), dominant genetic (D), shared environmental (C), and non-shared environmental (E) effects. AE (additive genetic plus non-shared environmental effects) models had the best fit for most of the domains, except for gambling and safety domains where CE models had the best fit, suggesting strong shared and non-shared environmental influences. Supporting the notion of risk-domain specificity, both the behavioral and genetic correlations among the seven

domains were generally low. Among the relatively few correlations between pairs of risk domains, the analysis revealed a common genetic factor that regulates moral, financial, and natural/physical risk taking.

After meta-analyses of extant twin studies across the seven risk domains, the results showed that individual differences in risk-taking propensity and its consistency across domains were mainly regulated by additive genetic influences and individually unique environmental experiences. The heritability estimates from the meta-analyses ranged from 29% in financial risk taking to 55% in safety.

This is the first effort to separate genetic and environmental influences on risk taking across multiple domains in a single study, and to integrate the findings of extant twin studies via a series of meta-analyses conducted in different task domains.

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