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“Familiality” or Heritability

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In their recent article, Hong et al¹ reported heritabilities of auditory sensory gating. As they defined it in their article, heritability reflects the proportion of overall variability in a trait in a population that results from additive genetic effects. Within human populations, such estimates have traditionally relied on special relationships that can (with some well-understood limitations) disentangle genetic from familial-environmental effects. The most popular of these methods have been twin studies comparing monozygotic and dizygotic twin pairs and various adoption designs.

However, in their study, Hong et al do not use these standard approaches. Rather, they examine individuals with schizophrenia (n=102) and 74 of their first-degree relatives. Heritabilities are estimated from sibling-sibling and parent-offspring pairs using the program SOLAR.² The problem with this approach is that data from these 2 relationships alone do not contain information that can, with any confidence, disentangle genetic from familial-environmental sources of resemblance. This is because for the major source of genetic resemblance—additive genetic effects—the expected correlation is the same in both of these relationships: +0.50. It is true that nonadditive genetic effects contribute to sib-sib but not to parent-offspring resemblance. However, given that there may be considerable sharing of environmental factors for both of these relationships, the a priori assumption that their effects are absent is hard to justify for many phenotypes.

We do not herein claim that heritability estimates from twin or adoption studies are without concerns. But they are based on well-understood quantitative genetic principles and their limitations have been widely examined (see Kendler and Prescott³ for concerns about the twin method). In studies such as that of Hong et al based only on first-degree relatives, we suggest that it would be advisable to use a more generic term such as *transmissibility* or *familiality* rather than the more specific term *heritability*.

References

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