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TYPE OF SUBMISSION: Oral paper

MEMBER STATUS: Associate

ELIGIBLE FOR THOMPSON AWARD: Yes
ELIGIBLE FOR ROWEWARD: Yes

TITLE: Testing the Phenotypic Null Hypothesis: A Multivariate Examination in MIDUS

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KEYWORDS: Phenotypic null hypothesis, causality, personality, bivariate heritability, MIDUS

ABSTRACT:
In their review of the behavior genetic literature on personality, Turkheimer, Pettersson, and Horn (2014) proposed a phenotypic null hypothesis. Rather than assuming that associations among phenotypes are due primarily to genetic or environmental sources of variance, the phenotypic null hypothesis states that associations among phenotypes occur at the phenotypic level. For example, the reason that conscientious students may do well academically is because conscientious behaviors aid in learning, rather than some underlying genetic or environmental pathway. Put in statistical terms, the phenotypic null hypothesis would be consistent with the bivariate heritability (i.e., the proportion of the phenotypic correlation due to genetic sources of variance) being equal to the heritability of one phenotype. The phenotypic null hypothesis has never been systematically tested across a range of phenotypes, nor has it compared across domains of phenotypes. Here, we use 40 phenotypes across multiple domains from Midlife in the United States II (N= 998 pairs) to empirically test whether associations are consistent with phenotypic causation or disproportionately due to genetic or environmental sources of variance. Across 1560 unique pairs of associations, we estimate the ratio of heritability to bivariate heritability. If the confidence interval of the ratio includes 1, then this result is consistent with the association being manifested at the phenotypic level. If the ratio tends to be

different from 1, then this result implies that genetic or environmental sources of variance play a disproportionate role in linking the phenotypes. Implications for behavior genetic models of phenotypic causation will be discussed.

GRANT SUPPORT: Daniel A. Briley is partly supported by a Jacobs Foundation research fellowship.
