ABSTRACT

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#### The etiology of social aggression

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Social aggression (SA) is a form of antisocial behavior in which social relationships and social status are used to damage reputations and inflict emotional harm on others. Despite extensive research focused on understanding the prevalence and consequences of SA, only three studies have examined the underlying etiology of these behaviors, with markedly inconsistent results. Moreover, all of these studies relied on a classical twin design (CTD), which can result in biased heritability estimates when the strict assumptions of the design are violated. The current study sought to overcome this limitation by estimating the etiology of SA using a nuclear twin family (NTF) design, which requires far fewer assumptions. We also fit the CTD model using the same data to evaluate whether its assumptions may have biased previous heritability estimates. Maternal-report, paternalreport, and teacher-report data were collected for twin SA (N=1,030 pairs). Self-report data was collected for parental SA. The best-fitting NTF model for all informants was the ASFE model, indicating that additive genetic, sibling environmental, familial environmental, and non-shared environmental influences significantly contribute to the etiology of SA in middle childhood. Unlike the NTF model, the bestfitting CTD model varied dramatically across informants. Although the specific NTF parameter estimates varied, SA generally emerged as largely additive genetic (A=0.07-0.62) and sibling environmental (S =0.18-0.50) in origin. The magnitude of S suggests that future research should attempt to identify specific sibling-level environmental influences that contribute to SA, such as peer groups, school experiences, parenting practices, and rearing neighborhood characteristics. Lastly, research has shown that the NTFM is superior to the CTD because it provides more nuanced and precise heritability estimates. Our results indicate that it may also be robust to informant effects and, therefore, a more valid assessment of etiology for these phenotypes in which informant biases are problematic.

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# The origins of social conservatism: an extended twin family study using self- and peer-reports

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It has long been recognized that social conservatism forms an important part of people's political orientations. This study examines key genetic and environmental sources of individual differences in this trait, using data taken from a German sample that included twins, their parents, and their spouses, and which incorporated both self- and peer-reports. The extended twin family design we used allowed for the examination of various aspects of social conservatism, such as: the effects of assortative mating and passive genotype-environment correlation; shared environmental influences originating from mothers only, fathers only, and both together; and non-parental environmental effects shared by twins. A comparison of self-report with peer-report findings indicated that although sex and age differences in social conservatism were comparable across the two rater perspectives, model analyses based on self-reports yielded substantially higher estimates of heritability, as well as higher levels of shared parental environmental influences, assortative mating, and genotype-environment correlation. These results, in particular the higher levels of heritability derived from self-report data, have important implications for how we understand social conservatism.

#### Hybrid marriages and phenotypic heterosis in offspring: evidence from China

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Qihui Chen China Agricultural University China In genetics, heterosis refers to the phenomenon that cross-breeding within species leads to offspring that are genetically fitter than their parents and exhibit improved phenotypic characteristics. Based on the theory of heterosis and existing genetic evidence, offspring of "hybrid" marriages (spouses originating from different states/provinces/countries/

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across all GWAS's. In total, over 200 GWAS's were included in the meta-regression analysis, where the total number of observations equaled  $\sim$  526.000 (the range of observations for individual age by rater by instrument GWAS was 309 to 10,812).

### Regulative, but not reactive, temperament traits and problem behavior are explained by the same genetic factors in Russian adolescents

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Temperament traits influence how an individual reacts to everyday situations which over time forms their unique personality. The regulation of one's behavior is required to fit into societal norms and adapt to peers, which is especially important in adolescence. Contemporary research shows that environmental factors, such as harsh discipline and marital discord, can moderate the relationships between temperament traits and emotional and behavioral problems in children and adolescents (Richters, 2010, Sulik, 2013). It has also been shown that genetic factors have a moderate influence on both temperament (Malykh et al., 2005) and problem behavior (Klein R. & Pine D., 2002). In our study we set out to disentangle the genetic and environmental factors that influence the relationships between temperament traits and emotional and behavioral problems. We based our study on the psychobiological approach to temperament developed by M. Rothbart is concerned with individual differences in both reactivity and self-regulation. Regulative processes are described through effortful control and its components: activation and inhibitory control. Reactive processes are broadly encompassed by negative emotionality and surgency. We used T. Achenbach's Youth Self Report (YSR) to assess emotional and behavioral problems and Rothbart's Adult Temperament Questionnaire (ATQ) to measure temperament traits. Our sample consisted of 372 twin pairs (164 MZ, 134 DZ, 74 opposite sex DZ). Participants were 14-19 years old, 54% were female. Building on our previous study, we analyzed the relationships between all available ATQ and YSR scales in a standard bivariate twin study design. We found that the common variance between the effortful control scales and related problems (most notably delinquent and aggressive behavior as well as attention problems) was explained mostly by genetic factors. In contrast, the relationship between many reactive temperament traits and emotional and behavioral problems (for example, internalizing problems with shyness and fear) were explained mostly by shared environmental factors. These results indicate that even though both temperament traits and problem behavior can individually be explained by genetic factors, clearly those factors are only similar in a few cases. This study was supported by RFBR Grant No. 15-06-10724.

# Adolescent-limited cannabis use and developmental delay

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Persistent heavy cannabis use in adolescence has been linked to a number of adverse outcomes, from deficits in neurocognitive functioning (Schweinsburg, Brown, & Tapert, 2008) to poor educational performance (Lynskey & Hall, 2000). These deficits have impacts that persist into later life, and have potentially serious negative consequences for adolescents who use cannabis regularly. These outcomes are also linked to delays in reaching adult developmental milestones (Brook, Zhang, Leukefeld, & Brook, 2016). In the first stage of this study, we examined a group of 93 adolescent cannabis users who we will describe as "adolescent-limited". Adolescent-limited cannabis users are defined as heavy, daily cannabis users at maximum frequency of usage as teenagers, but by the age of 20, their cannabis use has declined from daily use to sporadic use or total abstinence. We compare adolescent-limited cannabis users, persistent cannabis users (n over age 20=456), and abstainers (n over age 20= 1,567). We examine potential delays in adult transitions, falling into primary domains of education, career, and family structure. The indicators of these domains include; highest level of education, number years of education, finishing high school, university or trade school, or post-undergraduate education, ever employed, job type, income, income source, fulltime employment, relationship status, relationship satisfaction, and number of children. These three groups of cannabis users will be compared to describe the potential consequences of using cannabis as an adolescent, even if usage ceases in adulthood. This sample is drawn from several longitudinal studies at the University of Colorado Boulder, through the Center for Antisocial Drug Dependence samples, and the Colorado Community and Longitudinal Twin Samples.

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# Early handwriting style has both genetic and environmental origins

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Handwriting is a ubiquitous physical trace of human behaviour. It is individual to a particular writer, even among twins (Srihari et al. 2008). We rely on the stability and distinctness of handwriting style to establish the validity of legal documents and to convict individuals of crimes. However, although we know much about the genetic and environmental origins of traits such as reading, language ability and spelling, we know little about the origins of writing, and nothing to date about the aetiology of handwriting style. Previous research has shown that teacher-rated writing ability has both genetic and