The evolutionary genetics of personality: Does mutation load signal relationship load?

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Abstract: The mutation-selection hypothesis may extend to understanding normal personality variation. Traits such as emotional stability, agreeableness, and conscientiousness figure strongly in mate selection and show evidence of non-additive genetic variance. They are linked with reproductively relevant outcomes, including longevity, resource acquisition, and mating success. Evolved difference-detection adaptations may function to spurn individuals whose high *mutation load* signals a burdensome *relationship load*.

Keller & Miller (K&M) must be applauded for a brilliant article that provides the most compelling theory we now have for the evolutionary genetics of many mental disorders. This commentary extends the logic of their arguments to the evolutionary genetics of normal personality dimensions.

Mental disorders originating from a high mutation load, according to K&M, undermine reproductive success primarily by reducing the mating attractiveness of those afflicted. A similar argument can be made for normal personality variation.

The ends of some personality dimensions are known to be highly desirable in long-term mates (Buss & Barnes 1986; Buss et al. 1990). A study of 37 cultures found that, after "mutual attraction and love," "dependable character" (conscientious) and "emotional stability and maturity" were the most highly valued among 18 characteristics rated for their desirability in a long-term mate. Using a ranking procedure, "kind and understanding" (synonyms for agreeableness) and "intelligent" topped a list of 13 characteristics as the most desirable in a mate. The high ends of many major dimensions of personality, in short, figure importantly in an individual's "mate value" (Buss 2003).

Recent evidence reveals that major personality traits are polygenic and show substantial non-additive genetic variation (Eaves et al. 1998; Keller et al. 2005). These findings are consistent with the polygenic mutation-selection hypothesis.

Whereas mental disorders impair reproductive success, the positive ends of attractive personality traits facilitate fitness-relevant outcomes (Buss & Greiling 1999). Those high in conscientiousness, for example, tend to excel in resource acquisition and ascend status hierarchies (Kyl-Heku & Buss 1996; Lund et al., in press). They also live longer (Friedman et al. 1995). Those low in emotional stability (high on neuroticism) have greater difficulty holding jobs and sustaining marriages. Whether these difficulties historically undermined, or currently undermine, reproductive success remains unknown.

If a person's overall mate value is comprised of many different personality traits (along with non-personality variables such as physical attractiveness), then a given level of mate value can be attained through different combinations of personality traits (Buss & Barnes 1986). If people mate assortatively based on overall mate value, rather than on individual personality traits, one would expect low but positive assortment coefficients for the individual personality traits. That is precisely what assortative mating studies reveal (Buss 1984). Another prediction that follows is that higher assortative mating coefficients should be obtained by creating composite measures, summing the scores of each of the different desirable personality traits. High scorers – individuals with a highly attractive composite mating personality – should attract other high scorers. Those of lower mate value settle for commensurately lower-value partners. This prediction remains to be tested.

All of these findings – the importance of personality in mate selection, the importance of non-additive genetic variance for personality traits, the links between personality and reproductively relevant outcomes, and the low positive assortment coefficients for personality – are consistent with, but do not definitively verify, the hypothesis that mutations degrade personality performance. The arguments of K&M in the context of mental disorders, however, logically extend to the realm of normal personality functioning, at least for personality dispositions central to solving critical adaptive problems.

Evolved personality-assessment mechanisms (Buss 1996) – the categories we use to appraise and evaluate others in our social world – may function, in part, to assess the mutation load carried by potential mates. They might also function to assess the quality of allies, coalition partners, or even children who might be especially attractive targets of parental investment.

These evolved difference-detecting adaptations provide answers to some of the most important social problems that people have faced while traversing the adaptive landscape (Buss 1996): Will X be a good cooperator (agreeableness)? Will X be a hard-working resource provider and reliable in provisioning my children (conscientiousness)? Does X have the fortitude and resilience to hold steady during times of trouble (emotional stability)? Conversely, will X cause psychological damage (aggressiveness), betray my trust (impulsiveness), or neglect my children (undependability).

Individuals with certain personality characteristics inflict fitness costs on those with whom they become enmeshed. People low on emotional stability and low on agreeableness, for example, create tremendous conflict in mating relationships, absorbing valuable fitness-relevant resources that could be better allocated elsewhere (Buss 1991). In these ways, *mutation load* may signal *relationship load*.

Finland's Galapagos: Founder effect, drift, and isolation in the inheritance of susceptibility alleles

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Abstract: The target article excludes ancestral neutrality as a cause for the inheritance of schizophrenia, with an argument relating to selection against a single allele in the Finnish population. However, drift would predominate over selection within subisolates of the Finnish population. Comparisons of subisolates with heterogeneous populations may provide clues to the endophenotypic structure of complex polygenetic heritable mental disorders.

It is paradoxical that, though individuals who have mental disorders are more likely to die childless, the predisposition to these disorders seem to be inherited and the incidence rates seem not to decline across generations. Natural selection still has not uniformly eliminated the sets of gene codings in human DNA, the *susceptibility alleles*, which predispose some humans to mental disorder. The target article contrasts three extant models of the evolution of mental disorder. These models offer solutions to this apparent paradox, and this commentary discusses these models in the context of schizophrenia and autism.

The first of these models, ancestral neutrality, assumes that, within the environment of our evolutionary ancestors, the selection disadvantage of predisposition to mental disorder present in modern environments was absent. Accordingly, it is just a matter of time before the susceptibility alleles become eliminated.

The second balancing-selection model assumes that, although mental disorder has a selection disadvantage, that disorder also

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