

Evolutionary psychiatry: enhancing our current knowledge of psychopathologies

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Evolutionary psychiatry is a small discipline which has yet to have an established integrative framework. While evolutionary science has been taught at a tertiary level since the 20th century, psychiatry has tended to overlook evolution's influence in human susceptibility to mental disorders [1]. One reason for this has been medicine's penchant to view evolution as working at genetic and neurochemical levels, without recognizing evolution's role in shaping human behavioral patterns, as highlighted by Lorenz in 1937 [2].

Following from Tinbergen's thesis, evolutionary science highlights proximate (ontogeny) and ultimate (phylogenetic) causative categories. While proximate causes focus on how disease occurs, ultimate causes use evolution to explain why disease arises [3,4]. The inclusion of ultimate causation in understanding psychopathologies can provide insight into patients' symptoms. Importantly, is gene/environment interplay which is implicit in the proximate/ultimate causation framework. For example, it has been shown that later onset of menarche is associated by environmental stressors. Additionally, later onset menarche reveals the level of girls' "phenotypic plasticity" [4] In short, later onset of menarche may be suggested to be an adaptive response due to malnutrition or physical adversity leading to delayed maturation. Normal growth resumes once there is improvement in nutritional status and environmental conditions [5].

The notion of evolutionary mismatch has been seminal in understanding gene/environment processes. This refers to a dissonance between human traits that had originally evolved for adapting to evolutionary environments which are now maladaptive in human made milieus. In short, cultural evolution has outpaced biological evolution in our species with adverse consequences to human mental health.

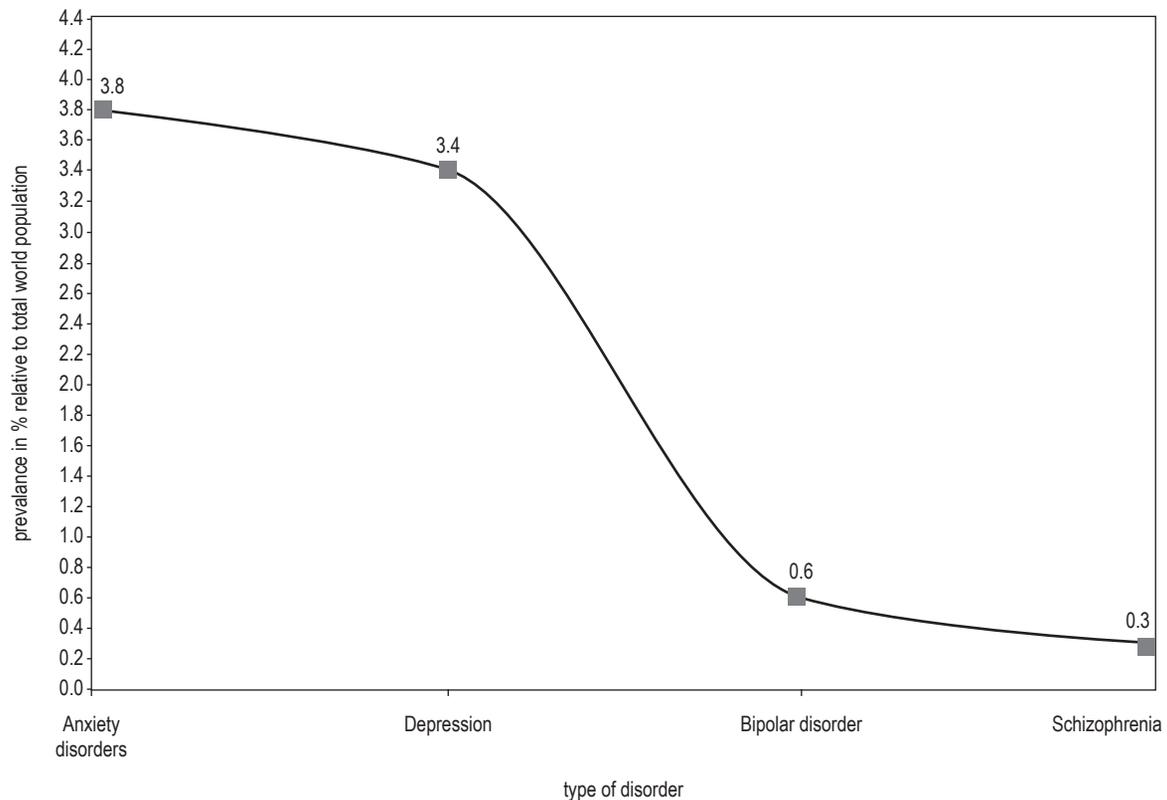
In relation to the human brain, evolutionary science points out that certain psychopathologies such as low spectrum schizophrenia may have been evolutionary advantageous in the Palaeolithic period, without conferring reproductive benefit.[6] Various authors note that current anxiety disorders should be considered as disproportionate sympathetic responses which had originally evolved for dealing mainly with acute stress in evolutionary environments [7,8]. This excessive sensitivity of human responses combined with novel environments where risk levels are significantly reduced can lead to avoidable distress [4].

Globally, approximately 614 million people experience various psychopathologies (anxiety disorders, depression, bipolar disorder and schizophrenia). This represents 7.9% of total world population, a significant prevalence. We may assume that the adverse environmental conditions which many individuals often encounter combined with evolutionary mismatch will increase this number. Hence, it is critical that psychiatry implements new ways to understanding and treating psychopathologies. (Figure 1)

Acknowledging that the human brain is an on-going product shaped by evolutionary processes provides a conceptual framework for integrating various causal factors. Consequently,

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Source: World Health Organization (WHO) 2017

Figure 1. Prevalence by mental disorder

this can assist in explaining why some individuals are more susceptible to experience psychopathologies [4]. St John rightly states that the inclusion of evolutionary science to psychiatry can also lead to developing a more integrative and comprehensive approach towards understanding the complex relationship between neuro-hormonal-endocrine regulation and human affectivity [4]. Given the level of complexity and novelty of current human societies combined with massive population size provides an optimal setting for the spread of many new genes, [9] which according to the Probable Mutation Effect [10] will be mostly disadvantageous [11].

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