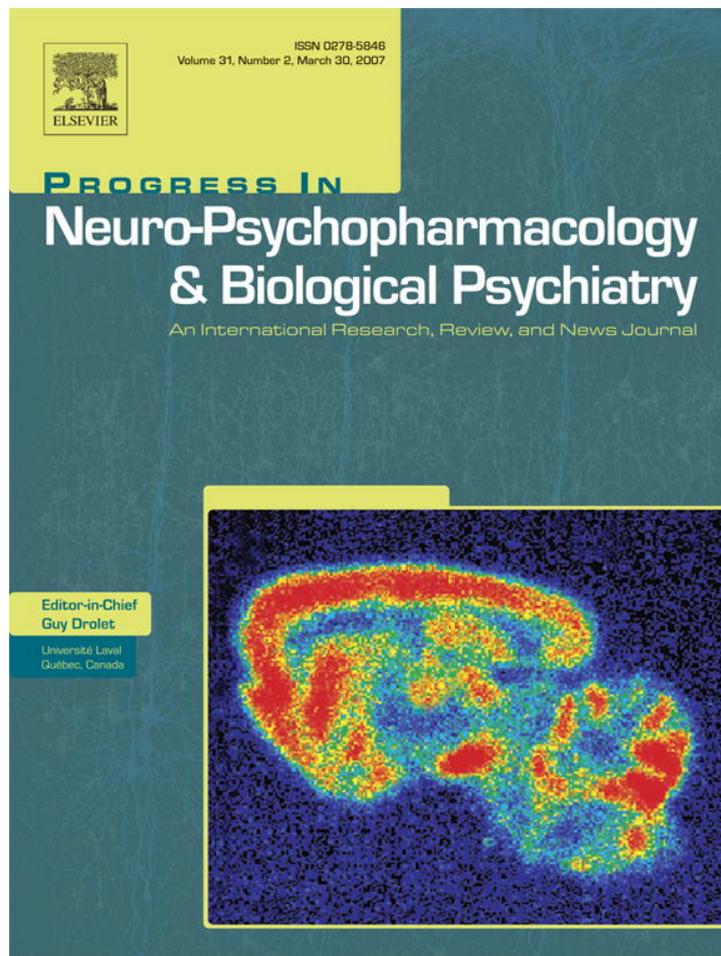


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Letter to the Editor

Comments on “Darwinian models of depression: A review of evolutionary accounts of mood and mood disorders” by Nicholas B. Allen, Paul B.T. Badcock. In: *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 30 (5) (2006) 815-826

Allen and Badcock have given an excellent review of evolutionary theories of depression. I would like to add a word for the benefit of those who are working on the proximate causes of depression using animal models, particularly those using subordination stress to induce presumed depressed mood. In the last century much work was done on subordination stress because it was noticed that subordinate animals tended to get cardiovascular, gastrointestinal and renal lesions. The affected animals were not considered a model of depressed mood, which was thought to be related exclusively to attachment behavior and to be caused by separation or loss. The work was supported by departments of general medicine, not psychiatry. The social competition theory of depression was stitched together by six psychiatrists and one clinical psychologist, all in full time clinical practice, and seeing a lot of depressed patients (Gardner, 1982; Price et al., 1994; Rohde, 2001; Price et al., 2004; Gilbert, 2004, 2006; Sloman et al., 2006; Wilson and Price, in press). It was useful in treatment because to see depression as involuntary subordination gave alternative strategies such as voluntary subordination, negotiation, and leaving the arena (the prototype is the biblical Job, in whom voluntary submission to God effected a considerable improvement in his mental state and circumstances). It also pointed to a wealth of animal models, since subordination has most likely been a feature of social life in every generation since our common ancestor with reptiles; Although many hunter gatherers are thought to be egalitarian, “humans are innately disposed to form social dominance hierarchies similar to those of the African great apes, but... prehistoric hunter-gatherers, acting as moral communities, were largely able to neutralise such tendencies — just as extant hunter-gatherers do” (Boehm, 1999, p.64).

Although the whole brain must be affected by depressed mood, the control mechanism is likely to be in the reptilian forebrain (corpus striatum). Reptiles would make a good animal model for the study of depression, especially because many of them change color when they lose rank. PubMed lists no reports of research on depressive illness using reptiles, whereas there are 696 reports in which rodents were used. Another promising model is the vervet monkey, one strain of which (but not, unfortunately, the vervets studied by McGuire and his colleagues (Raleigh et al., 1984)) have a bright blue scrotal

skin which seems to be part of its dominance display, and turns white when it falls in rank (due to hydration of the collagen fibrils which give it the Tyndall blue (Price et al., 1976)). It would be unwise to put all our investment into rodent work, such as the resident/intruder paradigm, because subordination in rodents appears to be mediated by the presence of the dominant animal (possibly by olfaction) and may be a different mechanism from other vertebrates, in which the subordination reaction is maintained after separation from the aggressor. Many rodents hibernate, and possibly the depressive mechanism has been taken over in rodents to control hibernation, which would explain the similarities of brain function in depression and hibernation (Tsiouris, 2005).

Three of the theories described by Allen are very similar, and posit a mechanism which regulates appetitive social behavior or social imitative. Nesse's (2000) theory that environmental propitiosness regulates investment is similar to Allen and Badcock's risk aversion theory, since all investment is risky; and both are similar to the social competition theory, since for a group living animal the main investment it can make is to challenge a higher ranking animal and attempt a rank reversal, and this is a risky undertaking. The main difference is between those who see mood as an adaptive regulating mechanism and those who regard depression as a disease caused by maladaptive mutations at a sufficiently large number of loci to account for its universal high prevalence (Keller and Miller, in press). The jury is still out, but in my view the likelihood of depression being a mechanism which has been regulating competitive behavior in most vertebrates for the last 300 million years or so is sufficiently high to justify a large expenditure of research effort on animal models of depression.

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