

Signs of Mood and Anxiety Disorders in Chimpanzees

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Abstract

Background: In humans, traumatic experiences are sometimes followed by psychiatric disorders. In chimpanzees, studies have demonstrated an association between traumatic events and the emergence of behavioral disturbances resembling posttraumatic stress disorder (PTSD) and depression. We addressed the following central question: Do chimpanzees develop posttraumatic symptoms, in the form of abnormal behaviors, which cluster into syndromes similar to those described in human mood and anxiety disorders?

Methodology/Principal Findings: In phase 1 of this study, we accessed case reports of chimpanzees who had been reportedly subjected to traumatic events, such as maternal separation, social isolation, experimentation, or similar experiences. We applied and tested DSM-IV criteria for PTSD and major depression to published case reports of 20 chimpanzees identified through PrimateLit. Additionally, using the DSM-IV criteria and ethograms as guides, we developed behaviorally anchored alternative criteria that were applied to the case reports. A small number of chimpanzees in the case studies met DSM-IV criteria for PTSD and depression. Measures of inter-rater reliability, including Fleiss' kappa and percentage agreement, were higher with use of the alternative criteria for PTSD and depression. In phase 2, the alternative criteria were applied to chimpanzees living in wild sites in Africa ($n = 196$) and chimpanzees living in sanctuaries with prior histories of experimentation, orphanage, illegal seizure, or violent human conflict ($n = 168$). In phase 2, 58% of chimpanzees living in sanctuaries met the set of alternative criteria for depression, compared with 3% of chimpanzees in the wild ($p = 0.04$), and 44% of chimpanzees in sanctuaries met the set of alternative criteria for PTSD, compared with 0.5% of chimpanzees in the wild ($p = 0.04$).

Conclusions/Significance: Chimpanzees display behavioral clusters similar to PTSD and depression in their key diagnostic criteria, underscoring the importance of ethical considerations regarding the use of chimpanzees in experimentation and other captive settings.

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Competing Interests: HRF and DLD are employed by Physicians Committee for Responsible Medicine, which is a non-governmental organization that promotes

higher ethical standards in research and alternatives to the use of animals in research, education, and training. JBM is employed by Chimpanzee Sanctuary Northwest, which provides lifetime quality care for formerly abused or exploited chimpanzees, while advocating for great apes through education and collaboration. GK is employed by AAP Sanctuary for Exotic Animals, which promotes the replacement of the use in apes in invasive research. CK is a consultant to

the World Society for the Protection of Animals and Chairman of the Board of Directors and Scientific Advisor to the Africa Network for Animal Welfare. LA is employed by Chimpanzee Sanctuary & Wildlife Conservation Trust, which promotes the conservation of chimpanzees and their habitats. EO CMJ and TA declare

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