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Cognitive bias in a non-human primate: husbandry procedures influence cognitive indicators of psychological well-being in captive rhesus macaques

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Abstract

*The measurement of 'cognitive bias' has recently emerged as a powerful tool for assessing animal welfare. Cognitive bias was initially, and widely, studied in humans, and describes the way in which particular emotions are associated with biases in information processing. People suffering from clinical levels of anxiety or depression, for example, interpret ambiguous events more negatively than do non-anxious or non-depressed people. Development of methods for use with non-human animals has revealed similar biases in several species of mammals and birds, and one invertebrate. However, cognitive bias has not been previously explored in any species of non-human primate, despite specific concerns raised about the welfare of these animals in captivity. Here, we describe a touchscreen-based cognitive-bias task developed for use with captive rhesus macaques (*Macaca mulatta*). Monkeys were initially trained on a 'Go/No-Go' operant task, in which they learned to touch one of two lines that differed in size in order to receive a reward (food), and to desist from touching the other line to avoid a mildly aversive stimulus (delay to the next trial and white noise). In testing sessions, the monkeys were presented with lines of intermediate size. We measured whether touchscreen responses to these ambiguous stimuli were affected by husbandry procedures (environmental enrichment, and a statutory health check involving restraint and ketamine hydrochloride injection) presumed to induce positive and negative shifts in affective state, respectively. Monkeys made fewer responses to ambiguous stimuli post health check compared to during the phase of enrichment suggesting greater expectation of negative outcomes following the health check compared to during enrichment. Shifts in affective state following standard husbandry procedures may therefore be associated with changes in information processing similar to those demonstrated in anxious and depressed humans, and in a number of other taxa.*

Keywords: *animal welfare, capture, emotion, enrichment, husbandry procedures, rhesus macaque*