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Enrichment and Individual Differences Affect Welfare Indicators in Squirrel Monkeys (*Saimiri sciureus*)

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Enrichment aims to improve captive animals' welfare by enhancing their environments. Two of the struggles associated with measuring welfare are identifying when animals' needs are being met or surpassed and identifying how individual differences play a role in these outcomes. Using a group of related Guyanese squirrel monkeys, we studied changes in five welfare indicators under different environmental conditions. Manipulating food presentation, walkways, and toys, we created five enrichment levels ranging from just above USDA standards to considerably more complex than the animals' normal housing. At the end of each level, a novelty test was performed in which an unfamiliar woman entered the enclosure and offered food. Changes in behavior as a function of enrichment condition were analyzed using a repeated-measures MANOVA. Compared to baseline, less enrichment consistently increased negative welfare indicators (abnormal behavior, aggression, and negative responses to the novelty test), while more enrichment sometimes decreased these indicators. Positive welfare indicators were less consistently related to enrichment, but positive response to the novelty test did increase somewhat in the most enriched condition. Across conditions, rank correlations revealed that individuals had highly consistent individual differences in positive responses to novelty and somewhat consistent individual differences in rates of aggression. The goal of the enrichment and the species, sex, and individual animals to be enriched should be considered when selecting a welfare indicator, and facilities measuring animal welfare should study changes in the behavior of specific individuals to control for individual differences.

Keywords: primate; welfare; enrichment; measurement; personality

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