Refinement – Enrichment

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The welfare of an animal is its state as regards its attempts to cope with the environment. Environmental enrichment is aimed to provide animals with resources and stimuli that offer them a degree of control which is fundamental for their ability to cope with the environment. Laboratory rodents housed in standard cages develop a range of abnormal behaviours and other signs of poor welfare that can be attenuated by adequate environmental enrichment. Against concerns that enrichment might disrupt standardization, we recently showed that the welfare of laboratory mice can be improved by environmental enrichment without reducing the precision and reproducibility of experimental results. In fact, these concerns were based on a flawed concept of standardization. It is based on the true finding that experimental results vary depending on environmental conditions, and on the false belief that standardization will 'spirit away' such variation. This has been referred to as the 'standardization fallacy'. Indeed, we recently showed that environmental standardization increases variation between replicate studies and the rate of false positive results, whereas systematic environmental variation (heterogenization) attenuates these deleterious effects. Taken together, these findings offer simple and effective strategies to improve both animal welfare and the validity of animal research in the best of meanings of the 3R concept.