

## Why Does Environmental Enrichment Not Work in My Study?

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### Abstract

Environmental enrichment is composed of physical, cognitive, and social stimuli. Animals are exposed to the sensory stimuli of environmental enrichment, causing ameliorated neurological and psychiatric disorders. However, environmental enrichment may not be working every time in the studies. The varying results are due to minor factors such as object novelty and the switching frequency of joy. The misuse of novelty and switch frequency causes the opposite effect, such as fear and anxiety, to confound the results. This article stresses the importance of the novelty of objects and the switching frequency of toys to improve the successful manipulations of environmental enrichments.

**Keywords:** *Environmental; Enrichment*

### Introduction

In 1947, Donald Hebb found that when rats were housed in a free environment, the rats' performance in a maze task was better than rats housed in a home cage, later, in terms of environmental enrichment. Later, researchers examined Hebb's findings related to environmental enrichment, and thereby the deficits of enriched environments might cause neurological dysfunctions associated with cognitive and emotional disorders. Under environmental enrichment conditions, individuals experience enriched social or physical environments, expose and interact with the surroundings, and feel free and novelty. Accordingly, the interaction process with enriched environments promotes neuronal activity and stimulates the brain [1-4].

In light of the previous data, environmental enrichments comprise sensory, social, physical, and cognitive stimuli to stimulate the brain [5-7]. Physical components include sizes, floor areas, door, and different textures and toys [8]. The various physical stimuli have been shown to stimulate the other brain areas of rats [9]. However, the previous studies have demonstrated that the environmental enrichment effect has not resulted from the physical stimulus and exercises. When removing the running wheel, cognitive stimulation was another essential factor in enriching the brain of animals, termed cognitive environmental enrichment [10-12]. Cognitive environmental enrichment omits running in the animal cage in physical enrichment. The purpose of the scroll wheel is to make animals lack opportunities to exercise, and it improves the recognition and spatial and working memory of animals. For example, a mouse with a rich living environment for six weeks would improve the object displacement or object recognition and the performance of space and working memory in a T-shaped maze and increase neuroplasticity. Therefore, the evidence was supportive of cognitive enrichment as an independent category in environmental enrichment.

Social environmental enrichment is another kind of environmental enrichment, and it is interacting with other partners in visual, auditory, and tactile sensations. For example, single housed rats without partners were demonstrated to experience chronic stress and caused abnormal behaviours; however, rats were housed with partners in an enriched environment, and these rats showed normal behaviour. Therefore, social interaction is also a crucial component of environmental enrichments.

As described above, environmental enrichments are required to expose the amounts of physical, cognitive, and social sensations. However, we found that some animals experienced physical, cognitive, and social sensory stimulation; however, it cannot effectively yield an environmental enrichment effect. In our observation, some minor tricky strategies should be concerned in environmental enrichment studies, for example, the object novelty and the switching frequency of the toy. For the novelty of an object, it is seemingly a conflict factor. In some conditions, the novelty sometimes induces anxiety and fear; however, the novelty object is seemingly attractive and rewarded for animal exploration behaviours in another situation. Accordingly, the changes and switch of the new object in the familiar environment are friendly for rats; in contrast, it is less to be aversive feelings for rats. On the other hand, the switching frequency of toys is enormous, causing anxiety and lower environmental enrichment effects. Therefore, the novelty of objects and the switching frequency of toys should be concerned in environmental enrichment studies.

### Conclusion

The manipulations of environmental enrichments need multiple sensory inputs, including physical, cognitive, and social stimulations. Based on the principle above that animals are exposed to numerous sensory information, the investigators may find that the environmental enrichment is still not working. The other minor factors should be concerned, such as the novelty of objects or the switching frequency. The novelty and the appropriate switch frequency can promote the successful probability of environmental enrichment to ameliorate neurological and psychiatric disorders. Why does environmental enrichment not work in the study? It should attend many factors.

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