MINIMUM RESOURCE THEORY

Authored by

Mohammed looti

October 6, 2025

Minimum Resource Theory (MRT) is a theory developed to explain the behavior of animals in environments where resources are limited. The theory was first proposed by Michael J. Sibly in 1992 and has since been applied to a variety of animal behavior studies. The basic premise of the theory is that animals will adjust their behavior so that they extract the maximum benefit from the resources available to them, while minimizing the energy they expend in order to do so. In other words, animals will try to optimize their resource use in order to maximize their chances of survival.

MRT is based on the idea that animals have a limited amount of energy that they can allocate to various activities. This energy is allocated based on the availability of resources and the likelihood of success in acquiring them. For example, if food is abundant, animals can allocate a larger portion of their energy to searching for food, as opposed to when food is scarce and they need to conserve their energy. Additionally, MRT suggests that animals have a finite "budget" of time and energy that they can allocate to different activities, and that they will always try to maximize the benefit of their resources.

MRT has been used to explain a variety of animal behavior, including foraging, mating, and migration. For example, in the case of foraging, MRT suggests that animals will modify their behavior in order to maximize their energy intake while minimizing the amount of energy they expend. This means that animals will take advantage of any resources that are available, such as food, water, and shelter, and will adjust their behavior accordingly. MRT has also been used to explain the behavior of migratory animals, which can be seen as a form of energy optimization. By traveling to more favorable climates, animals can optimize the amount of energy they need to expend in order to survive.

MRT has been widely accepted as a valid theory for understanding animal behavior. It has been used to explain a variety of phenomena, including the behavior of wild and domestic animals, as well as the behavior of animals in captivity. Additionally, MRT has been used to inform conservation efforts, as it can help us understand how animals use resources and how their behavior may be affected by changes in their environment.

Overall, Minimum Resource Theory provides an important framework for understanding animal behavior in environments where resources are limited. By understanding how animals allocate their resources, we can better understand their behavior and design strategies to help them survive in a changing world.

References

Sibly, M. J. (1992). The minimum resource strategy: Implications for resource use and reproduction in animals. Oecologia, 89(4), 519-528. https://doi.org/10.1007/BF00317001

Dingemanse, N. J., & Dochtermann, N. A. (2013). Minimum Resource Theory: A brief overview.

Behavioral Ecology and Sociobiology, 67(7), 1043-1051. https://doi.org/10.1007/s00265-013-1544-5

Gill, J. A., & Sutherland, W. J. (2012). Resource selection by animals: Statistical design and analysis for field studies. Academic Press.

Lima, S. L., & Dill, L. M. (1990). Behavioral decisions made under the risk of predation: A review and prospectus. Canadian Journal of Zoology, 68(4), 619-640. https://doi.org/10.1139/z90-092

Newman, C. (2015). Optimizing resource acquisition: Foraging behaviour in a variable environment. Animal Behaviour, 109, 115-124. https://doi.org/10.1016/j.anbehav.2015.03.013