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Commentary

Stimulation of Prolonged Flights while Birds Flying at Mid Night Indication

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DESCRIPTION

Many birds fly without stopping for days or longer; however, do they sleep while in flight, and if so, how? It is commonly believed that flying birds sleep with only one eye closed and one cerebral hemisphere active at a time, allowing them to maintain aerodynamic control and environmental awareness. However, flying birds have never been shown to sleep. We demonstrate here that great frigatebirds can sleep with either one hemisphere at a time or both hemispheres at the same time by using electroencephalogram recordings made of them while they were flying over the ocean for up to ten days. Unexpectedly, frigatebirds sleep for only 0.69 h d, or 7.4 percent of their time on land. This suggests that ecological demands for attention typically outweigh the benefits of sleeping hemispherically. Our findings not only prove that birds can sleep while flying, but they also cast doubt on the idea that they can fly for long periods of time without falling asleep on the wing.

Many different kinds of birds, including swifts, sandpipers, songbirds, and seabirds, fly nonstop for days, weeks, or even months. Since most animals suffer from sleep deprivation, it is often assumed that birds get the sleep they need on the wing every day. However, the possibility that birds do not sleep at all during long flights has been raised by the recent discovery that some birds can perform adaptively for several weeks despite drastically reducing their amount of sleep. Therefore, in order to answer this question, neurophysiological recordings of the changes in brain activity that are characteristic of sleep are required. Evidence of prolonged flights is not necessarily evidence of sleep in flight. In addition, such recordings are required to determine the quantity, intensity, and types of sleep, as well as the potential implications of flight-related sleep adaptations for comprehending the functions of sleep. It is unknown whether birds sleep on the wing because there are no recordings of brain activity during long flights. In response to shifting ecological demands, land-dwelling birds can switch from sleeping with both hemispheres at once to one at a time. During this type of Unihemispheric Slow Wave Sleep (USWS), birds keep the eye connected to their wake hemisphere open and pointed in the direction of potential danger. Additionally, dolphins use USWS to monitor their surroundings and are able to swim in this state. As a result, flying birds might rely on USWS to stay aware of their surroundings and maintain aerodynamic control over their wings while also getting the sleep they need to stay focused when they wake up. Great frigate birds were used to test this hypothesis.

Despite spending weeks or months flying over the ocean, frigate birds are not known to rest on the water, as Darwin discovered on his journey to the Galápagos Islands. After more than a brief contact with water, their long wings, poorly webbed feet, and reduced waterproofing of their feathers make it difficult to take off.

Great frigate birds use large predatory fish and cetaceans to bring prey, like flying fish and squid, to and above the surface in order to catch food. Since Frigate Birds Follow Ocean eddies that are indicative of opportunities for foraging during the day and night, previous studies found that potential feeding episodes (i.e., slow flight near the surface) occurred primarily during the day. However, under favorable conditions, feeding may also occur at night. As a result, when flying over the ocean, frigatebirds are subject to ecological demands for constant alertness.

This suggests that frigate birds have ecological needs for attention that they can't usually meet by sleeping in one spot. The prevalent belief that a significant amount of sleep is required on a daily basis to maintain adaptive performance is challenged by the capability to maintain cognitive performance on a limited amount of sleep.

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