

Incubation, not sleep, aids problem-solving

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Abstract

Solving a novel problem and finding innovative solutions requires a flexible and creative recombination of prior knowledge. It is thought that setting a problem aside before giving it another try aids problem-solving. The underlying mechanisms of such an incubation period could include unconscious processing that fosters spreading activation along associated networks and the restructuring of problem representations. Recently, it has been suggested that sleep may also support problem-solving by supporting the transformation and restructuring of memory elements. Since the effect of sleep on problem-solving has been mainly tested using the Remote Associates Test, we chose three different tasks—classical riddles, visual change detection, and anagrams—to examine various aspects of problem-solving and to pinpoint task-specific prerequisites for effects of sleep or incubation to emerge. Sixty-two participants were given two attempts to solve the problems. Both attempts either occurred consecutively or were spaced apart by a 3-hour incubation interval that was spent awake or asleep. We found that a period of incubation positively affected solutions rates in classical riddles, but not in visual change detection or anagram solving. Contrary to our hypothesis, spending the incubation period asleep, did not yield any additional benefit. Our study thus supports the notion that a period of *letting a problem rest* is beneficial for its solution and confines the role of sleep to memory transformations that do not directly impact on problem-solving ability.

[information processing](#), [sleep/wake cognition](#), [sleep and memory](#), [problem-solving](#), [riddles](#), [change blindness](#), [anagrams](#), [insight](#), [incubation](#)

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