Incubation

Authored by
mohammad looti

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Incubation is one of the 4 proposed stages of creativity: preparation, incubation, illumination, and verification. Incubation is defined as a process of unconscious recombination of thought elements that were stimulated through conscious work at one point in time, resulting in novel ideas at some later point in time.

The experience of leaving a problem for a period of time, then finding the difficulty evaporates on returning to the problem, or even more striking, that the solution "comes out of the blue", when thinking about something else, is widespread. Many guides to effective thinking and problem solving advise the reader to set problems aside for a time.

Paradigm for Investigating Incubation

The most widely adopted paradigm for investigating incubation involves comparing problems on which participants take a break during solving with problems on which participants work for a continuous period. The total time spent on each problem is equated across the conditions and the incubation period is usually filled with unrelated activity to prevent further conscious work on the problem. Superior performance on problems for which work is split over two sessions is taken as evidence for the incubation effect, which is thus operationally defined as any benefit of a break during problem solving.

Incubation effect and Emotions & Creativity

When discussing the relation between incubation effect - emotions and creativity, researchers found that positive mood enhances creativity at work. That means that we would expect a given day's creativity to follow reliably from the previous day's mood, above and beyond any carry-over of that previous day's mood. Theory and research on incubation, long recognized as a part of the creative process, suggest such cross-day effects. Thus, if positive mood on a particular day increases the number and scope of available thoughts, those additional thoughts may incubate overnight, increasing the probability of creative thoughts the following day.

Recent advances in neuroscience provide intriguing evidence of the mechanisms underlying incubation effects, particularly those that occur during sleep. This research reveals that people's experiences while awake can be consolidated into memory and result in enhanced performance the next day without any additional practice or engagement in the task. Moreover, there is mounting evidence that sleep can facilitate the types of memory and learning processes, such as associative memory, that contribute to creative problem solving. In one relevant experiment, researchers demonstrated that problem-solving insight can be dramatically enhanced by a period of sleep following initial work on a problem.

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The Cases For and Against Dreams Being Useful In Problem-Solving

In the 1970s, Stanford Sleep Lab Director William Dement gave 500 undergraduate students three "brain-teaser" problems to read over before going to sleep and to note whether they had solutions in their dreams that night; seven students had a dream containing the solution. Two decades later, 1993, Harvard psychologist Deirdre Barrett conducted research asking college students to incubate answers to real-life homework and other objective problems on which they were working, finding that in one week's time, ½ had dreamed about their topic and ¼ had a dream which provided an answer. Barrett also interviewed modern artists and scientists about their use of their dreams, documenting dramatic anecdotes including Nobel Prizes and MacArthur 'genius grants' whose ideas originated in dreams. Her research concludes that while anything--math, musical composition, business dilemmas--may get solved during dreaming, the two areas dreams are especially likely to help are 1) anything where vivid visualization contributes to the solution, whether in artistic design or invention of 3-D technological devices and 2) any problem where the solution lies in thinking outside the box--i.e. where the person is stuck because the conventional wisdom on how to approach the problem is wrong.

Not everybody agrees about the usefulness of dreams in solving problems. In an August 2004 article, "Dreams: The Case Against Problem-Solving," G. William Domhoff concluded : When all is said and done, there is only occasional anecdotal evidence for the idea that recalled dreams have any role in solving or detecting problems. This evidence is not impressive when it is arrayed against the small percentage of dreams that are recalled and the even smaller percentage of recalled dreams that might be construed as having a solution to a problem. Dreams may on occasion be useful to waking consciousness as a basis for thinking about problems in a new way, or as a basis for discussing personal problems, as some clinical research shows (Fiss, 1991; Greenberg et al., 1992). And dreams that have a dramatic emotional impact create a strong subjective sense that they must have a useful message. However, it does not follow from clinical usefulness or a waking impression of importance that dreaming has an adaptive function (Antrobus, 1993)."

The New-Paradigm Incubation Framework is another alternative to dreams that aims to reduce complexity and improve creativity, upstream, in decision-making and policy formulation. Its architect, Alain Paul Martin, has researched the incubation cycles of new paradigms related to creativity in economics, social psychology and other social sciences, medicine, and governance.

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