

# IMAGERY AND IMAGINATION IN PSYCHOLOGICAL SCIENCE

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## ESSAY 24/01

IMAGERY  
PSYCHOLOGY  
COGNITIVE PROCESSES  
PERCEPTION

Imagery and imagination are different mental abilities but the boundaries between them are not always clear. From a psychological perspective, imagery and imagination partially share the same underlying neural structures although referring to different mental processes. In both cases, the underlying ability is to create a internal representation, like a picture or a

film that is “projected” in our mind. Seeing with the mind’s eye, as it has been defined. However, while imagination preferentially refers to dream-like processes, imagery have stronger cognitive grounds and may be defined as the ability to generate, transform and manipulate mental representations involving visual and/or spatial characteristics.

What is an image? From a subjective, introspective point of view, the answer to this question is relatively simple. It is like a picture in our mind, something similar to seeing an object, but we can see it with our eyes closed. From a psychological perspective, the answer is not that simple: Is our mind able to generate a completely new image or just capable to re-activate a trace of what we have in memory? Is an image identical to a visual percept? Can we manipulate, transform, generate an image? Dreaming is a sequence of images like cartoons or old films are sequences of pictures?

If we go back to the history of psychology, Greeks and Romans already discovered the power of images. At a time in which memory and knowledge had a critical value in defining the identity of an individual, they had to understand how memory works and how to improve it (see Yates, 1966). It has been easy to understand that a visual representation of an object (i.e., an image) was easier to remember than the single word. This basic concept has been widely used by the Romans who developed various mnemonics (the method of loci is probably the best known of all) based upon the visualization of the to-be-remembered material. Cicero described the use of images in improving memorization in his work "De oratore" and this can be seen as the first text trying to give a formal account of the relationship between images and memory. Since then, this connection has always been recognized as a tool to understand and improve memory abilities and it is still widely used in the development of learning and memory strategies for cognitive rehabilitation (e.g., in aging or following neurological damage).

With the advent of experimental psychology, the theme of images started to become a distinct area of investigation of human cognition. Galton in 1883 dedicated a whole chapter of his book to imagery, as the human cognitive function associated to mental images. However, after his initial observations, psychological research forgot to deal about images for nearly a century. Around the sixties, for the first time Brooks (1968) demonstrated that verbal and visual

processes are clearly independent in our minds. Around the same years, Allan Paivio (1971) showed that words and images are processed separately and this may facilitate memory. What was empirically proved by the Romans, eventually found a scientific demonstration through the Dual-Coding theory, suggesting that two codes (verbal + visual) are better than one when it comes to remembering. In turn, Paivio also showed that words may have a different imagery value, that is may evoke images with different vividness or, in some cases, cannot even lead to a corresponding image. An example of the former effect can be found if we try to compare an image of Italy vs. Australia. It is likely, if one has not just been in Australia for a beautiful holiday, that our mental representation of Italy is more precise, rich in details and we may even see the colors of the different region that we studied at primary school. In a word: the image of Italy is more vivid. An example of the latter category is instead the comparison between an image of a chair and of truth. Can we generate an image of truth? To some extent is probably possible, but clearly the imagery value is very low. Paivio's theory explained why to higher imagery values correspond higher percentages of recall, i.e. a better memory.

Psychological research on imagery had a new impulse with the works of Steve Kosslyn in USA and, later, Bob Logie in UK. Kosslyn (1980) studied human mental images and he always concentrated on the idea that internal images are identical to visual percept. Imagery is seeing with the mind's eye and mental images share the same properties of visual inputs. Few years later, Logie addressed this same issue from a very different perspective. Surely, we can think of an image as the immediate internal representation arising from visual inputs. At the same time, we can generate a mental image from our memories (a poster I have/had in my room) or even produce a non-real, fantastic image (a pink elephant). Logie (1995) interpreted imagery as a memory function, and more specifically as a portion of the working memory system suggested by Baddeley and Hitch in 1974. Different authors continued to

develop one theory or another (see also Cornoldi and Vecchi, 2003), although, for most parts, the two ideas are largely compatible and they mainly refer to different inputs (internal vs. external) that may lead to generate a mental image.

Nowadays, imagery still have a place in psychological research, mainly helping to address the issue of the nature of mental representations. A mental representation is a more complex semantic concept in which visual and spatial characteristics may play a great role but also interact with different sensorial information (haptic, smell, taste) and continuously referring to semantic knowledge and long-term memories.

In sum, imagery is a complex cognitive function that can be considered not only as a function by its own (i.e. a mental image sharing visual and spatial characteristics), but also for its relationship with numerous other abilities such as perception, memory or attention. A mental image can be more or less vivid and we can also use it as a medium for reasoning and thinking. In some languages, there is not even a translation of the word imagery. The meaning of two clearly distinct words, such as imagery and imagination, are collapsed in a unique term, often referring to what imagination is (in Italian, for example, the only possible translation is *immaginare* and it refers to imagination). In fact, imagery conveys quite a different meaning from imagination (daydreaming, future thinking,) and we all know that thinking of a long holiday in Australia is – often – an exercise of imagination, whereas the decision of an alternate route in a traffic jam is more than imagination. It is imagery!

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