

Chapter 3

Visual Mental Imagery: A Key Representational Format

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ABSTRACT

Opinions diverge on the nature of visual mental imagery as a form of representation. Researchers adopting the pictorial position propose that visual mental imagery is concrete and pictorial in nature. Researchers adopting the propositional position believe that visual mental imagery is abstract and verbal in nature and deny images as an original form of information presentation. This chapter reviews the opposing theoretical stances and proposes that an acceptable resolution of the debate could be a dual representation position that takes visual mental imagery as a key representational format, suggesting complementary and integrating roles for verbal and pictorial representations in accounting for certain cognitive phenomena.

INTRODUCTION

Imagine that you are walking on the beach on a very windy day. Or cast your mind back to the kitchen in the house where you grew up as a child. Or think of that black dog in the film you saw last week.

It's easy to do all this imagining because we have the capacity to use mental imagery. Much of the time we initiate this image processing automatically even though we may subsequently be very aware of the features of the face of the character in a book we are reading or of the beach

or the dog. *Visual mental imagery*, the form of mental imagery that has been the subject of most research, is sometimes referred to as “visualising” or “seeing in the mind’s eye” when a physical stimulus is not present. It is also believed to play an important role in much of our thinking. Long before the current time, visual mental imagery was regarded as playing a crucial role in all thought processes and providing the semantic grounding for language (Thomas, 2010). Although visual mental imagery, (and closely related spatial imagery), has been the subject of much research, it has also been the subject of strong theoretic-

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cal debate: debate that has been focused on its status as a form of representation. In this paper we review key positions in the imagery debate in order to advance the theoretical position of imagery as a form of information representation, and the dual representation position as a resolution of conflicting theoretical positions taken on imagery. Towards the end of the paper we point to the potential value for student achievement of explicit training in use of good quality visual mental imagery.

Debate on the Representational Status of Imagery

Aristotle (c. 384–322 B.C.) gave visual mental imagery a prominent place in his philosophy of mind, asserting that “thought never occurred without a mental image” (as cited in Sadoski & Paivio 2001, p. 14). However, Plato (427–347 B.C.) had argued that visual mental images were the counterfeits of knowledge. According to Plato, thoughts were innate and changeless and were the objects of pure reasoning (Sadoski & Paivio, 2001). The two conflicting philosophical positions are so influential that most later philosophical and psychological stances grow out of one or the other.

Under the influence of Aristotle’s view on the role of visual mental imagery, the use of visual mental imagery was firmly established in Roman education in the fifth century. The mnemonic technique of the Method of Loci depended on the use of imagery to generate representations that might be inspected to recall details such as who might have been in a collapsed building (Yates, 1966). During the Renaissance and Reformation in the 14th to the 16th century, visual mental imagery was sometimes seen as a mystically powerful form of cognition and even seen as the means of creating new knowledge and understanding. In the late 17th century and the 18th century, many proponents of the classical tradition of visual mental imagery in memory such as Bacon (1561–1626) and Descartes (1596–1650) generally held that

visual mental imagery was useful in symbolically organising and categorising scientific thoughts.

The Romantic period — approximately from the mid-18th century to the mid-19th century — saw an escalating tension between the two views on visual mental imagery. A fervent proponent of the viewpoint that concrete sense was the foundation of all knowledge was Pestalozzi (Broudy & Palmer, 1965). He was best known for his object lesson in which the instruction moved from sense impressions to form abstract principles, verbal definitions and finally to concepts. Einstein, known as a great visual thinker, attended Pestalozzi’s school and claimed that his thinking was greatly influenced by this way of instruction (Miller, 1984).

Visual mental imagery held the same central place in the explanation of cognition to the researchers of the late 19th century who established psychology as an empirical scientific discipline. Wundt, who was regarded as the father of experimental psychology, insisted that higher mental processes including thought and memory depended largely on mental images (Wundt, 1912). Wundt based his argument on the findings of research conducted mostly with an introspective research methodology, which was regarded by some theorists as a flawed grounding for his theory (Carpenter, 2005; Danziger, 1980). However, later theorists argued that participants’ introspective reports in experiments, like patients’ report of symptoms to a doctor, were a useful source of data that could be correlated with other empirical observations to provide an improved understanding of participants’ mental processes (Marks, 1999; Velmans, 1999).

Under the influence of the *imageless thought controversy*, many of the psychologists and philosophers radically departed from the conventional view centring on the role of visual mental imagery. Rather, they believed that thoughts should be understood with respect to language and that it was wrong to have believed that the representational power of language derived from a more primitive form of representation such as visual mental im-

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