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Conscious and unconscious vision

Fahrenfort, J.J.

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Summary in English

This thesis is about conscious and unconscious vision. When somebody enters an elevator, the electronic eye at the entrance of the door takes notice and prevents the door from closing. However, no one will seriously claim that an elevator has the same sensation as our own when you see somebody come in. What makes us conscious of the things we see? What brain processes are responsible for conscious perception? And what brain processes have nothing to do with consciousness and are more similar to the way electronic eyes process visual information? The aim of this thesis is to begin to answer questions like these.

Descartes' dualism is often mentioned in jest, and although Descartes is probably most known for the notion of dualism, he is actually one of the founding fathers of the way we look at the relationship between mind and body today: the human body as a machine in 'Traité de l'homme'. In this book, Descartes introduces the concept of a 'reflex': an involuntary movement that is executed directly, without intervention by the conscious mind. Reflexes are obviously mechanistic and it is clear how they come about. How the conscious mind comes about is less clear.

As the brain processes visual information, it initially responds as in a reflex: fast, automatically and unconsciously. This initial reflex-like process is known as the Fast Feedforward Sweep (FFS). In this thesis, I defend the position that the FFS supports functions that have previously been associated with consciousness, such as the detection and categorization of objects. Experiments in this thesis show that the brain is able to detect and categorize objects without a person becoming conscious of these objects. Furthermore, I attempt to prove that the processes responsible for conscious perception only emerge after the FFS, in what is referred to as feedback or Recurrent Processing (RP). RP is the stream of processing through which early visual areas are reactivated, making use of nerve pathways that flow back from higher to lower visual areas. I show that this reactivation as a result of RP is what causes visual consciousness.