

# The black boxes essay example



## **Motor control as open and closed-loop systems.**

In high control, system serves as building block for many mechanical systems used today. Using the appropriate control one can design systems to perform tasks within the specified time. Motor control system consists two categories sharing some similar parts but differ in a variety of ways.

Open Loop control is the simpler of the two allowing one way flow of data and never and there is no feedback. This means that in the signal flow there is no transfer of data back to the source. The signal enters through the input stage, passes through the amplifiers to produce the desired output after which it leaves the system. Closed loop control are complex systems where the amplifiers can return to input stage. The system is flexible in that they can adjust itself depending on the information that it receives. In such systems, the amplifiers can control position and velocity and so there is consistent feedback(Magill, 2007 p. 18)..

## **Central control mechanisms**

The systems of humans have sophisticated control mechanisms that enable them to match the rates of oxygen uptakes to that of aerobic metabolism. The regulatory mechanisms that occur in the central nervous system demonstrate a degree of homology in mammals for example, human beings. The recent research shows that there is usually activation of the sympathetic nervous system in man and in genetic models such as spontaneous hypertensive rat. The central control mechanisms thus change the sympathetic activity and elevate blood pressure (Schmidt, 2002 p. 52). degrees of freedom problem, agonist-antagonist patterning, inhibition of actions and pre-programming of rapid movements.

The degrees of freedom problem in motor control argues that both humans and animals perform movement to achieve the same goals. When analysis is done of the elbow extension movements executed at maximal velocity, it reveals positive correlations in terms of timing of agonist-antagonist forces leading to both movement velocity and displacement. This finding is in relation to the fact that musculature gives braking force that arrest rapid limb movements. Movements are controlled motor programmes found in the brain as well as the spinal reflex mechanisms. The gain of spinal reflexes and H reflexes is modulated during the time of locomotion and also pathways play an integral part in this control (Schmidt, 2002 p. 321)..

### **Application of generalized motor programs in a practical situation**

The motor program has helped physical therapists with an approach aiming at understanding how the brain controls movement. Motor programs are perceived to contain commands for muscle allowing movement without the need of continuous peripheral feedback. It is widely used in clinical practice.

### **Differences and similarities between closed-loop theory and schema theory.**

Closed loop theory argues that processing of afferent information was central in human motor control. Strengthening memory trace is results from practice and feedback about movement outcome. These systems have a clear feedback mechanism (Magill, 2007 p. 312). On the other hand Schmidt's schema theory is an example of early motor program which did not adequately account for evidence illustrating the influence of feedback. The two systems however have some special similarities in that they are both nervous motor

responses which, operate under certain rules. They both trigger some form of movement within the human body.

cognitive and hierarchical control perspectives of motor learning

Cognitive and hierarchical control perspectives of motor learning also known as cybernetic, it is a substitute to the famously studied area of research, which is the broad stimulus response established in the study of behavioral psychology (Schmidt, 2002 p. 51). The distinct theory is a conceptual advancement of the stimulus response bonds because they have more structures. This can be concatenated to develop extended rings and chains of complicated behaviors famously known as plans.

Application to continuous motor skills

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