

Is Activation a Voluntary Task?

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Abstract

In ACT R, activation is defined as the degree to which past experiences and current context indicate that chunk will be useful at any particular moment. To find whether activation is a voluntary task or not different views were discussed. It was found that the concept of voluntary should be discussed by taking automatic and controlled processing into consideration. Finally it was mentioned that activation could be both voluntary and involuntary task .However its 'degrees vary depending on the type of process.

Keywords: Activation, Voluntary, Automatic Processing,Controlled Processing

1.What is activation?

The ACT-R is not only a theory that addresses knowledge acquisition. It has also developed to explain the question of how people select the appropriate knowledge in a particular context (Anderson,1993).Using the rational analysis, the ACT-R theory claim that the mind determines what knowledge is available according to its new situation of being used in a particular context .

In the modern view towards ACT R theory, Anderson (2002) believes that the various modules in ACT-R can be directly related to the different parts of the brain where learning, reasoning and other higher order brain functions take place. Brain scans were used to support this interpretation. In ACT-R the knowledge in the declarative memory, i.e., facts and goals, is represented in terms of chunks (Anderson& Lebiere, 1998). Meanwhile each declarative element in ACT-R also has associated with it an activation value.

2. Equation

Liadal (2007) defines activation as follows:" every chunk in ACT-R has associated with it a numerical value called its activation. The activation reflects the degree to which past experiences and current context indicate that chunk will be useful at any particular moment" (p.10).

The activation can be summarized in the following equation:

$$\text{Activation-level} = \text{Base-level} + \text{Contextual Priming (Liadal,2007,p.10)}$$

3. Is activation a voluntary task?

Conventionally, voluntary conscious acts and automatic behavior have been considered to be mediated by separate processes—and by separate brain structures. (Husain&Sumner, 2008 cited in Boy et al ,2010).

Matthews (2000) believes that the notion of activation as a voluntary task is related to the concept of automaticity. He mentions "automaticity is like a continuum. Such and idea is consistent with activation –based account of automaticity ,which considers the control of processing as both influenced by stimulus driven and voluntarily controlled activation "(p.121).

Halligan &Wade (2005) believes that the significant feature of controlled processing is attention. Therefore they believe that dealing with limited amount of information is voluntary and is subject to inference from other tasks. On the other hand, automatic processing does not require attention. It is involuntarily and is not limited in the capacity or open to inferences They refer to Norman & Shallice model (1986 as cited in Halligan &Wade,2005) .This model says "how attentive and pre attentive processes are controlled in both automatic and voluntary purposeful behavior. Stimulus enters perceptual processing mechanism and activates knowledge structure or schema stored in long term memory. The schema mostly activated by the incoming information takes the

control of an action. Schema activation and selection proceeds without any conscious control by voluntary attention and is controlled by an automatic system (ibid, p.62).

In this regard, as Umiltà&Moscovitch (1994) believe, automatic may have different interpretations. It may refer to the processes in which schema selection involves so little activation. On the other hand; they suggest that it would be a continuum of activation value and activation selection can occur on that. This is similar to the idea that automatic and controlled relation is a continuum rather than a dichotomy. Therefore, the link between a process being controlled and its being voluntary is also less clear (p.402).

Clark et al (1999) considers that cognitive theory doesn't claim that all cognitive processing or schema activation is under conscious voluntary control. On the contrary activation may be automatic, outside awareness and so non-conscious (p.101).

In this regard, Parkinson et al (2009 cited in Boy et al 2010) examined brain activation using functional magnetic resonance imaging (fMRI) during the involuntary movement and during a matched voluntary movement. They found that during involuntary movement, there was widespread activation of the cerebral cortex.

In fact, different parts of brain are involved in both voluntary and involuntary movement displaying clear activation differences between conditions (Mace, 2010). Later they found some similarities in the brain areas activated under both movement conditions namely in the left hemisphere.

4. Conclusion

To answer the question: *Is activation a voluntary Task?* We can say that Not always .Activation can be automatic, outside awareness and so non-conscious. Activation is a process and it is believed that it could be voluntary and involuntary task but its degrees vary depending on the type of process (Kennedy, Trafton, 2007).

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