Measuring Attention through computerized programs [1]

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The Attention Networks Test compiles two paradigms designed to measure attention in the human system. The test enables to measure the efficiency and independence of each attention network. It only takes twenty minutes to complete. The Attention Networks Test (ANT) is comprised of visual stimuli and reaction time tasks. These tasks are the Eriksen's Flanker Task (1974) and Posner's Cueing Paradigm (1980). Attention serves as a gate for the person to be aware of the senses (Posner & Fan, 2008). Also, the attention system allows for the regulation of impulses and learning in a safe environment (Abundis-Gutiérrez, Checa, Castellanos, & Rueda, 2014).

The ANT was developed based on the Theory of Attentional Networks (Petersen & Posner, 2012). The Theory of Attentional Networks states that attention has a neurocognitive basis in which each identified network acts as an independent mechanism but interacts with the other two to conceive the attention system on the human brain. Each network can be evaluated by presenting a stimulus associated to each cognitive network. For example, the Alertness Network requires that a cue is presented just before the target. The purpose of this cue is to indicate when the target will be presented. Also, the cue may not be presented but is used to measure the reaction time the subject takes to respond to the target stimulus. The Orienting network is evaluated through the presentation of valid or invalid cues that point either on top or bottom of the center of the computer screen where the target will occur. The Executive Control network is measured by presenting a row of five arrows pointing either left or right. If the target is congruent, the center arrow will point like the flankers, but if the target is incongruent the center arrow will point to the contrary direction. Reaction times and accuracy scores are then analyzed to measure the efficiency of each network.

The procedure for administration of the ANT requires the subject to respond to a series of visual stimuli that combine Posner's cueing paradigm and Eriksen's Flaker Task. Before the task the subject is instructed to respond as fast as possible to the correct answer. Then the subject is evaluated by the commission of errors and reaction times. A series of cognitive subtractions are

then made to assess and evaluate the efficiency of each attentional network. These networks are the Executive Control, the Alertness and the Orienting Networks.

The ANT has been adapted in many ways. It has been used to measure the development of attention networks on children from ages 7 to 10 (Rueda, et al., 2004) and 3 to 6 (Concepción-Cardona & Rueda, 2014). Also, the ANT is adapted for measuring how lateralized in the brain attention is (Greene, et al., 2008). Other studies include modulation of executive function by language (Wu & Thierry, 2013) and electrophysiological correlates of attention in childhood and adulthood using the electroencephalogram and event related potentials (Abundis-Gutiérrez, Checa, Castellanos, & Rueda, 2014).

The ANT serves as a sophisticated tool to be used on experimental and contextual conditions such as an educational scenario or a clinical intervention. We have to remember that Attention is one of the fundamental aspects of cognition that permits us to have consciousness. Also, attention is what we use as humans to gather information important to us. It is one of the most basic functions of an organism. It precedes decision making but it favors the formation of memories. Attention is a cognitive skill that is developed over time but requires cultivation and nourishment in a safe environment.

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