

The Dual-Process (DP) Theory of Human Intelligence

The Dual-Process (DP) theory of human intelligence (Davidson & Kemp, 2011; S.B. Kaufman, 2009, 2011, 2013) incorporates modern dual-process theories of cognition (see Epstein, 1994; Evans, 2008, 2010; Evans & Frankish, 2009; Kahneman, 2011; Kahneman & Frederick, 2002, 2005; Stanovich, 2004, 2011 — but also see Keren & Schul, 2009; Kruglanski & Grigorezner, 2011; Osman, 2004) into a theory of human intelligence. By doing so, the Dual-Process theory organizes many constructs relating to both explicit and implicit cognition that are at least partially separable and are meaningfully related to a wide range of socially valued intelligent behaviors. In particular, performance across a wide range of intelligent behaviors—across the arts and sciences—are predicted by a hierarchical structure of goal-directed and spontaneous cognitive processes. Goal-directed processes consume limited attentional resources, whereas spontaneous processes are not dependent on input from higher-level control processes (see Stanovich & Toplak, 2012).

The theory has a few key tenets. The first tenet is that there are meaningful and adaptive individual differences in both goal-directed and spontaneous cognitive processes. The second tenet is that both goal-directed and spontaneous cognitive processes jointly determine all intelligent behaviors, although in varying degrees depending on the behavior. A third tenet is that neither mode of thought is more “intelligent” than any other across the board, but what is important is the ability to flexibly switch mode of thought depending on the situation (for applications of this idea to creativity, see Gabora, 2003, 2010; Gabora & S. B. Kaufman, 2010; Howard-Jones & Murray, 2003; Martindale, 1995, Vartanian, 2009). A fourth tenet is that there are many different paths to the same intelligent behavior, with different people drawing on a different mix of cognitive traits to reach the same outcome. Finally, abilities are not conceptualized as static entities, but are seen as constantly changing through the life span as the individual continually engages with the world. This is where passion and inspiration comes into play (see Thrash & Elliot, 2003; Vallerand et al., 2003). The more one engages in a mode of thought, the more that individual will develop skills in that modality, which in turn increases the desire for engaging with that skill.

Goal-directed *cognition* is at the top of the hierarchy (alongside *spontaneous cognition*). Goal-directed cognition consists of a class of cognitive processes that involve the ability and tendency across situations to think about thinking (i.e., metacognition—see Dennett, 1992; Hertzog & Robinson, 2005), reflect on prior behavior, and use that information to modify behavior and plan for the future.¹

¹ Note that other definitions of “controlled cognition” have been put forward (see Schneider & Shiffrin, 1977).

Constructs that are part of the controlled cognition hierarchy include reflective engagement, self-regulation, self-control, perseverance, long-term planning, dissociable components of executive functioning—working memory, cognitive and affective inhibition, and mental flexibility—explicit cognitive ability (the skill set that lies at the heart of highly *g*-loaded tasks), intellectual engagement, and elementary cognitive tasks that support explicit cognitive ability. What links all of the processes together is that they all draw on a limited pool of attentional resources.

The second main component (alongside controlled cognition) of the DP theory is *spontaneous cognition*. At the broadest level, individual differences in spontaneous cognition reflect the ability to acquire information automatically and the tendency to engage in spontaneous forms of cognition. For instance, whereas most people have the ability to spontaneously experience gut feelings and day-dreams, there may be individual differences in the extent to which people are willing to engage with them.² Constructs that are part of the spontaneous cognition hierarchy include the following: mind-wandering, daydreaming, implicit learning, latent inhibition, intuition, acquired forms of expertise and long-term memory, and implicit domains of mind that are universal human domains pertaining to knowledge of spatial relations, number, probability, logic, language, people, language, music, aesthetics, living things, the inanimate physical world, or the beliefs and desires of other minds (Gelman, 2009; Hirschfeld & Gelman, 1994; Feist, 2008; Pinker, 1997).

Other technical details about the theory, including the hierarchical nature of the model, can be found in S. B. Kaufman (2009). Thus far, there is support for the theory, from different branches of psychology and neuropsychology. For instance, a recent study found that individual differences in implicit learning predict intelligent behaviors such as language learning and verbal analogical reasoning above and beyond *g* and the cognitive mechanisms underlying *g* (S.B. Kaufman et al., 2010). Since the theory is so new, however, it has not had enough time to garner much criticism or support. The extent to which the various components of the DP theory increase prediction of intelligent behaviors across a wide range of situations remains an open question.

² The distinction between goal-directed and spontaneous cognition, according to the DP theory, is not always the same as that between conscious and unconscious cognition. Spontaneous cognitions can be either conscious, such as when an individual is aware of his or her vivid fantasies, or nonconscious such as when an individual feels an intuition without knowing what brought about that intuition or when an individual implicitly learns the underlying rule structure of the environment. Likewise, some goal-directed processes can operate without meta-awareness while still consuming limited attentional resources.

*Excerpted from: Kaufman, J.C., Kaufman, S.B., & Plucker, J.A. (2013).
Contemporary theories of intelligence. In J. Reisberg (Ed.), The Oxford
Handbook of Cognitive Psychology. New York, NY: Oxford University Press.*