



From heart to mind and back again. A duality of emotion overview on emotion-cognition interactions



Kamil K. Imbir

Faculty of Psychology, University of Warsaw, ul. Stawki 5/7, 00-183 Warsaw, Poland

ARTICLE INFO

Article history:

Received 6 May 2015

Received in revised form
26 March 2016

Accepted 25 April 2016

Available online 28 May 2016

Keywords:

Duality of mind
Experiential mind
Rational mind
Automatic emotion
Reflective emotion

ABSTRACT

This paper presents a model of emotion-cognition interactions based on a duality of mind approach to mental processes, distinguishing between automatic and controlled cognitive processes. The emotional domain may be treated as a specific kind of cognitive process, which implies that a dual mind systems approach could be very useful in understanding some types of emotion-cognition relations. Recently, a duality of mind approach has been applied to distinguish between so called automatic and reflective emotions. This provides for four types of emotion-cognition interactions. The experiential system governs the influence of automatic emotion processes on heuristic cognition and the rational system governs the influence of reflective emotion on systematic cognition, but the influences of automatic emotion on systematic cognition and reflective emotion on heuristic cognition involve cross-system interactions. Activation mechanisms are system-specific: arousal for the experiential and subjective significance for the rational system.

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For thousands of people worldwide, the fundamental question is not if, but how emotions influence everyday life. For many years the relationship between emotions and cognition has been treated as a testing ground for theories by psychologists in both sub-disciplines (Huntsinger & Schnall, 2013). There are two main ways, in which cognition and emotion can be related. Firstly, cognition can be the basis of emotion (Greenwood, 1992; Hulse & Hampson, 2014; Lazarus, 1991; Scherer, 2005; Zajonc, 1980). For example appraisal theories of emotion states that cognitive processing underlies all emotional processes. Here such emotions will be referred as reflective ones. Secondly, emotional processing can have cognitive outcomes. Several theories have offered accounts of how affect or emotion changes cognition (e.g. Bower, 1981; Clore & Huntsinger, 2007; Forgas, 1995; Pessoa, 2008a,b; Sandamirskaya, Zibner, Schneegans, & Schöner, 2013; Warnick, LaPorte, & Kalueff, 2011; Xenakis, Arnellos, & Darzentas, 2012), but the results of experiments concerning effects of emotions on cognition are still remaining inconsistent. For example, while some data suggest that positive emotions improve cognitive functioning (e.g. decision making: Isen, 2004), while other data suggest the same effect for negative emotions (e.g. Bodenhausen, Sheppard, & Kramer, 1994b). Finally other authors argue that all emotions (both positive and

negative) makes the processing more heuristic in nature and thus more biased and less accurate (e.g. Kahneman, 2011). What is lacking in our knowledge is a description, with adequate specificity, for the emotional and cognitive processes involved. According to duality of mind theories, our mind consists of two separate systems (for review see Gawronski & Creighton, 2013): (1) an experiential system (Epstein, 2003) responsible for automatic functioning (Bargh, Chen, & Burrows, 1996) and (2) a rational system responsible for controlled processing (often involving thinking and deliberation). In this paper I discuss how the duality of mind approach can be used to provide an account of emotion-cognition interactions. Four types of emotion-cognition interactions with very different behavioral outcomes are postulated here. This paper also aims to propose a theoretical framework for a new line of research.

For the purposes of this article, emotion is defined as a reaction (physiological, behavioral and mental, c.f. Frijda, 2007) relating to the evaluation of a stimulus (Jarymowicz & Imbir, 2015). The evaluation of a stimulus may be based on its biological value (Damasio, 2010) or another automatic and nonverbal mechanism (such as homeostatic processes; evaluations of hedonic value, aversion) that gives the organism a sense of what is good or bad for survival in its current environment. However, emotions can also be the result of a cognitive appraisal of the situation: assessment of the current situation against standards, goals and expectations (Clore &

E-mail address: kamil.imbir@gmail.com.

Ortony, 2000). The human mind uses language to express thoughts, expectations and feelings and to understand the surrounding world. The appraisal processes broaden the emotional complexity of humans. Here I refer to both types of emotion-related processing as emotions, but it is worth noting that some authors use the term “affect” for emotions that are the results of automatic processing (c.f. Storbeck & Clore, 2007; Zajonc, 1980) and “feelings” to describe emotions that are the result of a cognitive appraisal based process (c.f. Scherer, 2004). Most emotional states are associated with a particular, external object (Clore & Huntsinger, 2007), but in some cases the cause of emotion can be an internal state (e.g. hunger, fatigue) or even purely mental state, not associated with a specific environmental stimulation (e.g. hallucinations reported during stimuli deprivation).

1. Duality of mind models

Duality of mind theories describe and compare automatic and controlled processes. In a review of a wide range of social-psychological duality theories, Gawronski and Creighton (2013) divided them into three main groups: (1) those dealing with domain-specific problems; (2) generalized dual process theories and (3) formalized (using mathematical modelling) dual process theories. Generalized theories have attracted most attention over the last ten years as their main aim is to identify general principles of behavior. Generalized theories describe how different mental systems are associated with different activity types. They include the concept of the experiential-rational self (Epstein, 1994, 2003); associative vs. rule-based processing (Sloman, 1996; Smith & DeCoster, 2000); heuristic-analytic systems (Evans, 2003); system 1 vs. system 2 processing (Kahneman, 2003); the reflection-reflection model (Lieberman, 2003) and the impulsive-reflective model (Strack & Deutsch, 2004).

In the approach presented here, I do not argue whether some of these differentiations are better than others (for critical analysis of dual mind theories see: Evans, 2009; Evans & Stanovich, 2013), but I use the generalized duality of mind approach as a base for thinking about the way the mind works. For the purpose of this work, I use the differentiation of two types of mind using Epstein's (1994, 2003) terms: experiential (also referred to as automatic; associative; heuristic; intuitive; system 1) and rational (also referred to as controlled; rule-based; analytic; extensional; reflective; system 2). I want to highlight similarities of dual minds in each theoretical proposition (to better understand presented here model), but I keep in mind some important differences between each of the dichotomies cited above.

It has been proposed (Bargh, 1994; Gawronski & Creighton, 2013; Moors & De Houwer, 2006) that there are four criteria for automatic processing: (1) it is elicited unintentionally; (2) it requires only minimal cognitive resources; (3) it cannot be stopped voluntarily and (4) it occurs without conscious awareness. In contrast, controlled processing is (1) initiated intentionally; (2) requires considerable cognitive resources; (3) can be stopped voluntarily and (4) occurs with conscious awareness. Of course in practice it is hard to find examples of processing that fulfil all the criteria for automatic or controlled processing: we have to deal with mixed (automatic and controlled) processes and the emotional states arising from them. Our mind works as a unit in everyday situations, and both types of processes contribute to our behavior. For example Haidt (2012) uses interactions between both minds as a base for his model of the “righteous mind” that describes human morality in terms of moral intuitions vs. moral reasoning. His point of view puts more stress on the formation of automatic moral intuitions than controlled and rational moral reasoning. His theorizing and research provide very good examples of how minds

interact in a field that was usually treated as the domain of the rational mind.

Epstein (2003) gave a full description of both types of mind based on self in which personality mechanisms and structures were divided into two main systems. According to Epstein, *experiential mind* is holistic, focused on emotion (pleasure-pain), based on automatic associations and strongly outcome oriented. Behavior is mediated by “vibes” from past experience. Reality is encoded using concrete images, metaphors and narratives. Processing is rapid and directed towards immediate action. Changes in the experiential mind are slow and result from repetitive or intense experience. The experiential system is also characterized by a crudely differentiated, broad-generalization gradient. Thinking is categorical, crudely integrated, dissociative and partly organized by emotional complexes (cognitive-affective modules). Experiences are passive and preconscious: we are seized by our emotions. The validity of experience based on self-evidence means “experiencing is believing”.

In contrast, Epstein's *rational mind* is analytical, logical, focused on reason (what is sensible) and process oriented rather than outcome oriented. Cause-and-effect connections are visible and behavior is mediated by conscious appraisal of events. The rational mind encodes reality using abstract symbols, words and numbers, which means that processing is slower and the resulting actions are relatively delayed. The rational mind changes more rapidly than the experiential mind, at the “speed of thought”. Processing is more differentiated, multi-dimensional and thus more integrated than that of the experiential mind. Experiences are active and conscious (the individual is in control of her or his thoughts). Validity of experience must be demonstrated logically and empirically.

Some theories make reference to the role of emotions, particularly those concerned with system 1 processing, associative thinking, reflexive and impulsive processes. Epstein posited that the degree of emotional arousal was what determined the balance between the experiential and rational systems. But duality of mind theories have neglected emotions (feelings) based on deliberation and cognitive appraisal (the exception being Strack and Deutsch's model (2004), although emotions were not the main subject of their proposition and they include only a few references to emotion). This gap is addressed by a recently proposed taxonomy of human emotions (Jarymowicz & Imbir, 2015).

2. Emotion duality model

The classical philosophical heart-mind distinction is a useful reference point for studies of emotion (Jarymowicz, 2012). Although there have been some bimodal explanatory models of evaluative processes (Cacioppo & Gardner, 1999; Haidt, 2001; Jarymowicz, 2012; Zajonc, 1980), the duality of mind perspective is not often taken into account in studies of emotion. Some emotional states appear to be automatic and uncontrolled reactions to stimulation; most basic research on emotion has been related to this primary type of emotional process (see Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012 for a review) and the brain mechanisms underlying such emotional processes are relatively well-known (Berridge, 2003; LeDoux, 1996, 2012; Panksepp, 1998, 2005). But we cannot skip deliberative thinking as a basis for emotional experience. Both traditional and modern appraisal (Arnold, 1969; Lazarus, 1991; Scherer, 2005) and psychological constructionist (Barrett, 2006; Mandler, 1975; Schachter & Singer, 1962) accounts of emotion argue that reflective processes are not only involved but are essential to emotional experiences. However the term “appraisal” is often used to refer to any type of evaluation that involves cognitive processing; only some of these theories specifically address evaluations based strictly on deliberation (e.g.

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