

**Jonathan St. B. T. Evans**

*Thinking Twice: Two Minds in One Brain.*

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Jonathan St. B. T. Evans is one of the founders of the so-called dual process theory in cognitive and social psychology. In a number of papers published in professional journals, he has made significant contributions to the development of the theory. In *Thinking Twice: Two Minds in One Brain*, he presented this theory for more general readers. To this end, he surveys the literature in a wide range of subjects from cognitive and social psychology to cognitive neuroscience to evolutionary psychology to philosophy of mind, and he draws the results from them into a unified picture.

This is not a book just for a novice to the theory, however. Even for those familiar with it, reading *Thinking Twice* would be a rewarding experience. This is because Evans did considerable conceptual work to formulate the theory. One example is the ‘system’ talk of the dual process theory. The theory has been generally described in terms of systems: the human mind has two systems, System 1 and System 2. System 1 is activated when we engage in unconscious and quick-and-dirty thinking, but it takes only little time and cognitive resources. System 2, on the other hand, is activated when we engage in a conscious, deliberative thinking, but it consumes significantly more time and cognitive resources. However, Evans no longer believes that our mind is divided into two *systems* (218). Although he does say that there are two types of processes (type-1 and type-2 processes, sharing many phenomenological features with so-called System 1 and System 2, respectively), he points out that we often use *both* types of processes in the ‘reflective’ ( $\approx$  System 2) thinking.

Dropping ‘system’ talk, Evans employs ‘mind’ talk to describe his account of mind. He represents our mind as the place where two minds reside: the intuitive and the reflective mind. Since the reflective mind is something added to the intuitive mind during the course of evolution, he also refers to the intuitive and reflective minds as ‘old’ and ‘new’ minds. The working of the intuitive mind is primarily done by type-1 processes, which are close to what evolutionary psychologists call modules. The working of the reflective mind is characterized by various type-2 processes, in particular working memory, although both types of processes are certainly involved. In some sense Evans’ classificatory framework is broader and bolder in scope than system talk (219), but he takes this as a strength of the theory, because he believes that system talk leads us to an oversimplified view of both minds.

For another example of conceptual clarification, Evans declines to use some familiar phenomenological properties, including quickness, to characterize type-1 and type-2 processes. Look at his criticism of recent positive evaluations of ‘gut feeling’ or quick decision-making in popular media and some professional journals (Chapter 5). There are a variety of cognitive biases such as the framing effect and the outcome and

hindsight biases, which let us make suboptimal decision/reasoning. However, people like Malcolm Gladwell and Gerd Gigerenzer recently claim that following gut feeling or ‘fast and frugal’ heuristics does let us make an optimal decision. Evans objects that some of the so-called ‘intuitive’ judgments described in their writings are actually under control of the reflective mind. He also brings our attention to the fact that the cases Gladwell depicts in his book are ideal cases for intuitive judgment—multiple cue judgments with relevant experiential learning (imagine an experienced doctor using different examinations to diagnose a patient)—and when those conditions are not met, the intuitive mind would easily fall prey to various biases, as in probability judgments (100-04).

Confabulation is another important topic discussed throughout this book. It has been objected that the dual process theorists characterize the reflective mind only as giving normative answers in the ‘heuristics and biases’ experiments (cf., N-E. Sahlin, A. Wallin, and J. Persson, ‘Decision Science: From Ramsey to Dual Process Theories’ *Synthese* 172 [2010]: 129-43.). In confabulation, however, the reflective mind merely cooks up a false reason for the output produced by the intuitive mind. This occurs when a subject of the selection task gives a ‘reason’ for their choice when they are in fact under the matching bias (175), as when an alcoholic describes herself as a ‘social’ drinker to justify her behavior (194). In cases like these, the reflective mind helps us behave suboptimally.

This, then, is how Evans makes considerable efforts to resolve the ambiguities of the dual process (or two minds) theory. Unfortunately, this does not mean that a reader will have a sufficiently clear picture of it after reading the book. The concern is this. Evans presents his account in three ways. Each way has strengths and weaknesses. But he places little emphasis upon a fourth possible way.

Evans largely represents his theory in three different ways. i) He contrasts the two minds theory with the chief executive model, a folk theory of mind that we have only one (conscious) mind which always controls our behavior though explicit mental representations (3). ii) He describes the theory phenomenologically, that is, from the surface properties the subjects’ thinking exhibits, such as effortfulness and explicitness. iii) He also discusses mental mechanisms behind those surface properties, such as working memory and particular brain regions.

We cannot rely solely on ‘i’ to support the two minds theory. Although there is strong evidence against the chief executive model (171), it may be a false dichotomy, because the two minds theory is not the only alternative to the model. As for ‘ii’, one may easily identify which mind is currently at work with a list of property-pairs, but mindless application of the list is not a reliable method to identify the kind of mind, as the some of the ‘intuitive’ decisions described by Gladwell and Gigerenzer are in fact a feat of the reflective mind. In respect of ‘iii’, specifying underlying mechanisms behind the two minds is more reliable and promising. This is why Evans cites the studies on implicit and explicit memory systems (Chapter 3) and neurological studies (178-81). But the correlation between phenomenology and underlying mechanisms is not perfect, as the explicit belief system is activated even in belief bias. In addition, data on such a

mechanism are not always available. Evans himself seems to draw on phenomenology when he discusses pathological gambling (192-5).

Perhaps we may define the two minds in terms of their *functions*. This is to define the two minds in terms of the (possibly adaptive) problems they are designed to solve. The intuitive mind is to solve swiftly the problems one encounters routinely in the environment. The reflective mind is to solve novel, important, and complex problems while using many resources. This conception of the two minds theory has a virtue: one does not need to show that there is a strict correspondence between neurological mechanisms and each mind to claim there are two minds, because a striking feature of a functional kind is its multiple realizability (think of money). One should notice, however, that to adopt this functional conception of the two minds is not to return to the crude phenomenological conception. If one mindlessly uses the list of familiar property-pairs to identify the nature of a behavior, one might mistake the quick use of the reflective mind—such as confabulation and fast and frugal heuristics—as products of the intuitive mind. But if the reflective mind costs more in resources to solve a novel problem, and if we are designed to save cognitive resources whenever possible, it comes as no surprise that we often use the reflective mind minimally, e.g., to give a lazy justification to the conduct of the intuitive mind. And I believe that Evans is (consciously or unconsciously) aware of this interpretation when he calls the two minds ‘old’ and ‘new’, because this is not about the time period *per se* when the second mind was added. Addition of the new mind reflects an environmental change our hominid ancestors went through during their evolution; we faced changing (social or physical) environments where we encountered novel adaptive tasks that the intuitive mind alone could not solve.

While there is room for further clarification on the account Evens presents, I still believe that this book is the best case currently available for the dual process theory. One can find a couple of books on the same subject for general readers, such as Daniel Kahneman’s *Thinking, Fast and Slow* (New York, NY: Farrar, Straus & Giroux 2011). A reader of *Thinking Twice*, however, will find that Evans strikes just the right balance between readability and conceptual rigor. This is why I strongly recommend this book to anyone, whether a psychologist or not, who is interested in the dual process theory. (I am very grateful to Nils-Eric Sahlin for his comments on an earlier draft.)

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