

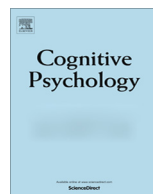


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What makes us think? A three-stage dual-process model of analytic engagement



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ABSTRACT

The distinction between intuitive and analytic thinking is common in psychology. However, while often being quite clear on the characteristics of the two processes ('Type 1' processes are fast, autonomous, intuitive, etc. and 'Type 2' processes are slow, deliberative, analytic, etc.), dual-process theorists have been heavily criticized for being unclear on the factors that determine when an individual will think analytically or rely on their intuition. We address this issue by introducing a three-stage model that elucidates the bottom-up factors that cause individuals to engage Type 2 processing. According to the model, multiple Type 1 processes may be cued by a stimulus (Stage 1), leading to the potential for conflict detection (Stage 2). If successful, conflict detection leads to Type 2 processing (Stage 3), which may take the form of rationalization (i.e., the Type 1 output is verified *post hoc*) or decoupling (i.e., the Type 1 output is falsified). We tested key aspects of the model using a novel base-rate task where stereotypes and base-rate probabilities cued the same (non-conflict problems) or different (conflict problems) responses about group membership. Our results support two key predictions derived from the model: (1) conflict detection and decoupling are dissociable sources of Type 2 processing and (2) conflict detection sometimes fails. We argue that considering the potential stages of reasoning allows us to distinguish early (conflict detection) and late (decoupling) sources of analytic thought. Errors may occur at both stages and, as a consequence, bias arises from both conflict monitoring and decoupling failures.

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truthiness (noun)

1: “truth that comes from the gut, not books” (Stephen Colbert, *Comedy Central’s “The Colbert Report,”* October 2005).

1. Introduction

A few months after the 2003 invasion of Iraq, current Vice President and then Senator Joe Biden asked President George W. Bush how he can be so sure that the United States was on the right course. Bush responded by putting his hand on the Senator’s shoulder and saying “my instincts” (Suskind, 2004). Bush’s faith in his gut feelings in the face of conflicting or contradictory evidence is, not incidentally, reminiscent of comedian Stephen Colbert’s concept of “truthiness”.¹ There appears to be a great deal of truth to the idea of truthiness and, in fact, it has been known for decades, dating back to Kahneman and Tversky’s heuristics and biases research program, that humans often rely on intuition when making decisions (Tversky & Kahneman, 1974; for a recent overview, see Kahneman, 2011).

An additional point that is rarely emphasized, however, is that gut feelings do not *always* predominate. Some individuals are less likely to “go with their gut” when reasoning (Stanovich & West, 1998, 2000) and problems that cue conflicting response outputs have been shown to lead to deliberative reasoning (De Neys & Glumicic, 2008; De Neys, Vartanian, & Goel, 2008). Investigations of the factors that *undermine* intuitive decision making may lead to interventions which could be used to avoid future errors; or, in other words, to maximize “truth” and minimize “truthiness”. To that end, it has been suggested that one of psychological science’s most pressing goals should be to “give debiasing away” to the general public (Lilienfeld, Ammirati, & Landfield, 2009).

We argue that basic cognitive research that elucidates how debiasing happens in the absence of explicit top-down intervention could be a fruitful source of practical benefit in the public sphere. In the current work, we attempt to elucidate the cognitive processes that guard against reasoning failures by introducing a three-stage dual-process model of analytic engagement, along with 4 experiments that test predictions generated from the model. Our goal is to integrate perspectives on bias and irrationality that have previously been considered antithetical by breaking the reasoning process into stages and components. We argue that a consideration of the bottom-up *sources* of analytic thinking offers a new perspective that leads to novel predictions.

1.1. Dual-processing

Human reasoning and decision-making is thought to involve two distinct types of processes (for reviews, see Evans, 2008, 2010a; Evans & Stanovich, 2013a; Frankish & Evans, 2009; Sloman, 1996; Stanovich, 2004): Type 1 processes that are intuitive, fast, autonomous, and high capacity; and Type 2 processes that are reflective, slow, and resource demanding. Type 1 processes are thought to provide default outputs that may be acted upon as explicit representations manipulated in working memory via Type 2 processing (Evans & Stanovich, 2013a; Thompson, 2013). However, the question of what leads someone to engage deliberate and effortful reasoning in lieu of more intuitive and automatic cognitive processes is still unclear and, as a result, has been the focus of much recent scholarship

¹ The following is the full quote from Suskind’s *New York Times* article: “Forty democratic senators were gathered for a lunch in March just off the Senate floor. I was there as a guest speaker. Joe Biden was telling a story, a story about the president. “I was in the Oval Office a few months after we swept into Baghdad,” he began, “and I was telling the president of my many concerns” – concerns about growing problems winning the peace, the explosive mix of Shiite and Sunni, the disbanding of the Iraqi Army and problems securing the oil fields. Bush, Biden recalled, just looked at him, unflappably sure that the United States was on the right course and that all was well. “‘Mr. President,’ I finally said, ‘How can you be so sure when you know you don’t know the facts?’” Biden said that Bush stood up and put his hand on the senator’s shoulder. “My instincts,” he said. “My instincts.” Biden paused and shook his head, recalling it all as the room grew quiet. “I said, ‘Mr. President, your instincts aren’t good enough!’” The democrat Biden and the Republican Bartlett are trying to make sense of the same thing – a president who has been an extraordinary blend of forcefulness and inscrutability, opacity and action.”

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