

## Letter

## The Mythical Dual-Process Typology

Gordon Pennycook,<sup>1,\*</sup>  
Wim De Neys,<sup>2</sup>  
Jonathan St. B.T. Evans,<sup>3</sup>  
Keith E. Stanovich,<sup>4</sup> and  
Valerie A. Thompson<sup>5</sup>

'The central premise of the 'two types' framework has to do with alignment, or the degree to which the attributes within each category co-occur.' Melnikoff and Bargh ([1], see p. 2)

Melnikoff and Bargh [1] offer a challenge to what they term the **dual-process typology** (see [Glossary](#)): specifically, the idea that cognitive processing is either unintentional, uncontrollable, unconscious, and efficient (Type 1) or intentional, controllable, conscious, and inefficient (Type 2). The authors argue that no one has ever tested this proposition and they provide examples of thoughts that do not abide by the proposed featural configuration of the typology (e.g., that processing might be unconscious but also intentional). These examples, it is argued, invalidate the common 'two-types framework' and the authors conclude that distinguishing between two types of processes is 'systematically thwarting scientific progress' (Abstract). However, the authors make a critical error that undermines this conclusion: one need not assert alignment among a set of features to argue that one specific feature can be justified as a dual-process dichotomy (in contrast to **unimodal theories**, which argue for continuous processing).

Melnikoff and Bargh [1] rightfully trace the origins of **dual-process theories (DPTs)** to a series of seminal papers in the mid-1970s and the critique of DPTs to the late 1980s and 1990s – specifically,

the critique of versions of DPT that viewed it as two long lists of features that were always aligned. Where Melnikoff and Bargh go awry is in ignoring the past 15 years of work on DPT in which various theorists [2–7] have refined and fleshed out the implications of the original 1970s' papers. Although individuals looking to apply DPTs to various psychological phenomena or to public policy may assume an alignment or a correlation between various features, research focused specifically on the specification of DPT has long ago left behind the 'list-of-features' view.

Importantly, DPT advocates such as Evans and Stanovich [4] have explicitly argued against assuming an alignment of the numerous characteristics that have been assigned to so-called 'Type 1' and 'Type 2' processes over the years (see also [8,9]). Instead, they distinguish between **defining features** – those that are used to define the two-types distinction – and **typical correlates** – those that various researchers have associated with the two-types distinction.

Rather than acknowledging these developments, Melnikoff and Bargh [1] challenge an outdated list-of-features view of DPT (i.e., the dual-process 'typology'). Curiously, they stress consciousness as a key feature although it has played little role in recent revisions of DPT [4]. Melnikoff and Bargh also argue that the fallacy where Type 1 processing is necessarily bad/error prone and Type 2 processing is necessarily good/rational is 'central to numerous dual-process theories' (p. 3). However, this fallacy has also been strongly challenged by dual-process theorists [4,8,9]. Indeed, it has recently been argued in the context of a dual-process model that Type 2 processing may come in the form of either rationalization (i.e., motivated reasoning), which perpetuates bias in typical decision-making tasks, or cognitive decoupling, which overrides

## Glossary

**Defining features:** introduced by Evans and Stanovich [4]; single characteristics or sets of characteristics that distinguish between Type 1 and Type 2 processes. For example, some theorists have focused on autonomy as a defining feature of Type 1 processes (i.e., processing is either mandatory given the presence of triggering conditions – Type 1 – or not mandatory – Type 2) [11,12].

**Dual-process theories (DPTs):** a class of theories in which two fundamentally different types of cognitive processes are distinguished.

**Dual-process typology:** a term introduced by Melnikoff and Bargh [1] to represent the idea that cognitive processes can be sorted into two types with aligned characteristics: (i) Type 1 processes, which are unintentional, uncontrollable, unconscious, and efficient; (ii) Type 2 processes, which are intentional, controllable, conscious, and inefficient.

**Typical correlates:** also introduced by Evans and Stanovich; the various characteristics that have been associated with Type 1 and Type 2 processes (e.g., intentionality, controllability, consciousness, efficiency) but do not define the distinction for a given DPT.

**Unimodal theories:** a class of theories in which cognitive processing is thought to occur only along a continuum.

and corrects bias [6]. In fact, Morewedge and Kahneman [10], who the authors cite as advocating the good/bad fallacy, note in their conclusion that 'in many situations, [System 1] automatically, quickly and effortlessly generates a skilled response to current challenges', thus undermining the idea that the good/bad fallacy is central to their dual-process account (p. 439).

Although Melnikoff and Bargh mention Evans and Stanovich's [4] concept of typical correlates, they do not mention the central concept of defining features. They instead pursue the side issue of encouraging skepticism about the claim that some features are correlated until more empirical evidence is available. While we concur that some dual-process theorists assume a correlation among non-definitional features (e.g., that autonomous Type 1 processing is typically faster than

non-autonomous Type 2 processing) and that theoretical claims should be tested empirically, this issue is nonetheless irrelevant to the central thesis that Melnikoff and Bargh set up and knock down: that some set of Type 1 and Type 2 features are aligned and that this is a central premise of the two-types framework. This is not a necessary requirement of DPT (which could be based on a single dichotomy); the authors do not substantiate their typology claim with regard to any specific examples, and they ignore recent research that has directly refuted this list-of-features view. They thus present their arguments as addressing the foundation of DPT when in fact it is largely irrelevant to current investigations of the theory (see [3]).

In 2013, Evans and Stanovich argued that ‘in general, these critiques (of DPT) are problematic because they attack not any particular theory but rather a class of theories, effectively treating all dual-process and dual-system theories alike’ (p. 224). This is true of Melnikoff and Bargh, who not only attack a class of theories instead of any specific DPT, but aim their critique at a set of assumptions that contemporary theorists have explicitly refuted.

<sup>1</sup>Department of Psychology, Yale University, New Haven, CT, USA

<sup>2</sup>LaPsyDe (CNRS Unit 8240), Paris Descartes University, Paris, France

<sup>3</sup>School of Psychology, University of Plymouth, Plymouth, UK

<sup>4</sup>Department of Applied Psychology and Human Development, University of Toronto, Toronto, ON, Canada

<sup>5</sup>Department of Psychology, University of Saskatchewan, Saskatoon, SK, Canada

\*Correspondence:

[gordon.pennycook@yale.edu](mailto:gordon.pennycook@yale.edu) (G. Pennycook).

<https://doi.org/10.1016/j.tics.2018.04.008>

#### References

1. Melnikoff, D.E. and Bargh, J.A. (2018) The mythical number two. *Trends Cogn. Sci.* 22, 280–293
2. Bago, B. and De Neys, W. (2017) Fast logic? Examining the time course assumption of dual process theory. *Cognition* 158, 90–109
3. *Dual Process Theory 2.0*. De Neys, W., ed., 2017. Routledge

4. Evans, J.S.B.T. and Stanovich, K.E. (2013) Dual-process theories of higher cognition: advancing the debate. *Perspect. Psychol. Sci.* 8, 223–241
5. Newman, I.R. et al. (2017) Rule-based reasoning is fast and belief-based reasoning can be slow: challenging current explanations of belief-bias and base-rate neglect. *J. Exp. Psychol. Learn. Mem. Cogn.* 43, 1154–1170
6. Pennycook, G. et al. (2015) What makes us think? A three-stage dual-process model of analytic engagement. *Cogn. Psychol.* 80, 34–72
7. Stanovich, K.E. and Toplak, M.E. (2012) Defining features versus incidental correlates of Type 1 and Type 2 processing. *Mind Soc.* 11, 3–13
8. Stanovich, K.E. et al. (2011) The complexity of developmental predictions from dual process models. *Dev. Rev.* 31, 103–118
9. Evans, J. (2012) Dual process theories of deductive reasoning: facts and fallacies. In *The Oxford Handbook of Thinking and Reasoning* (Holyoak, K.J. and Morrison, R.G., eds), pp. 115–133, Oxford University Press
10. Morewedge, C.K. and Kahneman, D. (2010) Associative processes in intuitive judgment. *Trends Cogn. Sci.* 14, 435–440
11. Pennycook, G. (2017) A perspective on the theoretical foundation of dual-process models. In *Dual Process Theory 2.0* (De Neys, W., ed.), pp. 5–39, Routledge
12. Thompson, V.A. (2013) Why it matters: the implications of autonomous processes for dual process theories – commentary on Evans & Stanovich. *Perspect. Psychol. Sci.* 8, 253–256

## Letter

### The Insidious Number Two

David E. Melnikoff<sup>1,\*</sup> and John A. Bargh<sup>1</sup>

We recently joined other researchers [1–5] in challenging the popular assumption that ‘consciousness’, ‘efficiency’, ‘intentionality’, and ‘controllability’ are correlated such that they form two clusters – those typically called ‘Type 1’ and ‘Type 2’, which we refer to collectively as the

dual-process typology. More specifically, we argued that (i) these processing features have never been shown to correlate with one another, (ii) there are good reasons to assume that the features are, in fact, completely uncorrelated, and (iii) the features are incoherent, therefore (iv) the dual-process typology should be abandoned [6].

In their commentary, Pennycook, De Neys, Evans, Stanovich, and Thompson (hereafter, PDES&T) seem to agree that cognitive scientists should not assume that processing features are correlated [13]. They say we went awry, however, because the dual-process typology is ‘outdated’. For instance, PDES&T state that Evans and Stanovich (the third and fourth authors of PDES&T) ‘explicitly argued against assuming an alignment of the numerous characteristics that have been assigned to so-called “Type 1” and “Type 2” processes . . .’. PDES&T also state that, in their opinion, featural alignment ‘is not a necessary requirement of dual-process theory’. The sole requirement for dual-process theory, they believe, is the existence of one dichotomous feature – this ‘defining feature’, as they call it, need not correlate with anything for dual-process theory to be valid.

We wish to make two points. First, to our knowledge, hardly any dual-process advocates agree with PDES&T that the alignment assumption is outdated and unnecessary for dual-process theory (and for good reason; see Box 1). In fact, PDES&T provide no evidence that these

#### Box 1. A Dual-Process Theory without Correlated Features Is Not a Theory

PDES&T never explain how a theory could possibly consist of a single ‘defining feature’ if the ‘defining feature’ is not correlated with any other features. Theories must generate predictions [12], and it is unclear how any predictions can be derived from a ‘defining feature’ that is not correlated with anything. Indeed, PDES&T insist that the ‘defining feature’ of a dual-process theory need not correlate with effort, speed, controllability, intentionality, awareness, erroneous responding, or any other feature that has been associated with Type 1 and Type 2 processing – as far as we can see, such a dual-process ‘theory’ would be incapable of making a single prediction. Thus, it seems to us that when PDES&T say that zero degree of featural alignment is required for dual-process theory, they are saying something deeply incoherent – that is, they are saying that dual-process theory need not make predictions.