

PIOTR KOZAK \*

## **WHY SHOULD WE BE REALISTS ABOUT BELIEFS? THE RATIONAL INDISPENSABILITY ARGUMENT FOR REALISM**

**SUMMARY:** This paper defends realism about beliefs by presenting the rational indispensability argument, which claims that beliefs are indispensable for explaining how norms of rationality shape human behaviour. I begin by examining the normative aspect of belief ascription and the essential connection between beliefs and rationality highlighted in logic and cognitive psychology. Mild anti-realism, as articulated by Pośłajko, allows beliefs to exist for explanatory purposes but denies them natural properties, claiming they are not causally efficacious or strictly individuatable. Against this, I argue – drawing on Wundt’s argument about the relationship between normative disciplines and descriptive sciences – that if rationality norms influence human reasoning, then beliefs must be real in a robust, naturalistic sense: causally efficacious and individuatable. I adapt the Quine-Putnam indispensability argument from the philosophy of mathematics to argue that our best theories of rationality require ontological commitment to beliefs as real entities. I conclude, contra Pośłajko, that recognising the explanatory role of rationality norms commits us to a realist metaphysics of belief.

**KEYWORDS:** realism, mild anti-realism, the rational indispensability argument for realism, Wundt’s argument, naturalism.

---

\* University of Białystok, Institute of Philosophy. E-mail: piotr.kozak1@gmail.com.  
ORCID: 0000-0001-9734-4640.

## 1. Introduction

Some people believe that the Earth is flat. Others believe in trickle-down economics. Sometimes, we listen and do not judge, as to err is human. However, there are times when we are, and should be, more judgmental.

Our beliefs might not always be accurate. But, more importantly, they can also be irrational. Imagine some irrational students who simultaneously believe that  $3 > 2$  and  $2 > 1$  but also hold that  $3 < 1$ . We would say this is not only incorrect but also irrational. If they believe that  $3 > 2$  and  $2 > 1$ , then they are compelled to believe that  $3 > 1$ . If they do not believe this, then they should.

Furthermore, the principles of rationality influence the *existence* of beliefs and the way we attribute them. Suppose the same students believe that Frege's Puzzle consists of a thousand pieces and that Popper's Gambit is a cunning chess move. In these cases, we should clarify these concepts for them and at least reconsider our teaching methods. That is what they pay us for.

However, once we clarify the concepts of Frege's Puzzle and Popper's Gambit, students cannot claim that these concepts refer to their standard objects of reference while still asserting that Frege's Puzzle consists of a thousand pieces and Popper's Gambit is a cunning chess move. If they do so, they do not truly understand these concepts and do not hold these beliefs.

The examples above demonstrate the normative aspect of the concept of belief and the practice of attributing beliefs. There are circumstances where we are justified in expecting someone to change their mind, whether due to new facts or conflicting beliefs. Some beliefs may be irrational, and others might make it rational to form additional beliefs. In summary, rationality puts constraints on our beliefs.

This intricate relationship between rationality norms and beliefs is one of the primary reasons for introducing the concept of beliefs into our scientific practice. For instance, it is expected that logic establishes normative standards for reasoning. Logic has been taught with the expectation that it guides our thinking and, consequently, our beliefs. We aim to avoid inconsistencies in our beliefs. We criticise others for failing to recognise the logical consequences of their beliefs. We endeavour to adhere to the principles of logic. Admittedly, this goal has not always been fully realised. However, there have been occasions when success has been achieved.

Secondly, analysing beliefs in relation to rationality is a key aspect of the research paradigm on reasoning in modern cognitive psychology. To cite a few examples, Wason's selection tasks (1968) have highlighted the challenges we encounter in conditional reasoning, which has significantly influenced subsequent theories of reasoning within psychology over the past fifty years. The Heuristics and Biases research programme, started by Tversky and Kahneman (1974), has shown how our decisions often differ from the traditional rationality model, prompting debates on the nature of decision-making in the social sciences during the 1970s and 1980s. Lastly, the so-called Great Rationality Debate

(Gigerenzer, 2015; Stanovich, 1993) has reignited discussions about the rationality of human beliefs.

Granted, most psychological research shows that we make mistakes in our reasoning and do not blindly follow the rules of logic. Most probably, human rationality is bounded (e.g., Gigerenzer, 1993, 2000; Simon, 1990), meaning that reasoning norms are context-dependent and only meaningful in relation to specific contents and situations. Determining how well formal norms align with content and context requires empirical investigation.

Furthermore, the link between normative (how we ought to reason) and descriptive theories of rationality (how we actually reason) remains an open question (e.g., Oaksford and Chater, 2007). On one side, some psychologists, without dismissing the validity of the normative perspective, contend that cognitive psychology should concentrate on the descriptive aspect (e.g., Elqayam and Evans, 2011). On the other side, some psychologists, inspired by the Quinean naturalised epistemology, aim to integrate the descriptive and normative dimensions (e.g., Schurz and Hertwig, 2019). Finally, some believe that purely descriptive research cannot proceed without reference to normative considerations, and empirical results can only be understood in relation to norms of rationality (e.g., Hahn, 2025; for an overview, see, e.g., Chater et al., 2018).

However, no one denies that we are relatively rational, and sometimes we do adhere to norms of rationality (see, e.g., Stanovich and West, 2000). After all, we can learn the rules of logic and/or probability theory, and there is no argument about our ability to apply them. Moreover, psychologists study how to improve our reasoning to be more rational (e.g., Knauff and Spohn, 2021; Sturm, 2012). In other words, examining whether and how rationality norms influence human beliefs is essential to cognitive psychology. For some thinkers (e.g., Davidson, 1970), these questions distinguish psychology from other special sciences.

In cognitive psychology, the concept of beliefs is fundamentally linked to the idea of rationality. The term 'belief' is not just a folk psychological term we use daily; it is a technical term used across various fields of logic and psychology, particularly in relation to how standards of rationality influence our cognitive processes. In other words, the main reason for introducing the concept of belief into philosophy and psychology has been to explain the rationality behind our behaviour.

Exploring the connection between rationality and beliefs is outside the scope of this paper. Some (e.g., Engel, 2018; Shah and Velleman, 2005) link the rationality of beliefs to their truth conditions, suggesting that what sets beliefs apart from other mental states like feelings is that truth determines their correctness conditions, and that attributing beliefs follows norms of truth. Others (e.g., Helton, 2020; Zangwill, 2005) argue that rationality or irrationality is a necessary characteristic of a belief. For instance, believing that  $3 < 1$  requires the ability to revise that belief in accordance with rationality norms.

For the purposes of this paper, it is sufficient to hold that beliefs can be rational or irrational. However, this does not imply that the concept of belief consists solely of normative properties or that beliefs are constitutively normative (e.g., Bykvist K. and Hattiangadi A. 2007; Ciecierski, 2017). Recognising that norms of rationality constrain beliefs does not fully determine the metaphysics of beliefs, either. The idea that beliefs can be rational or irrational aligns with most views on the nature of beliefs, such as representationalism (e.g., Burge, 2010; Fodor, 1975) or interpretationism (e.g., Dennett, 1987).

The only assumption I make is that it is reasonable to believe (pun intended!) that any full-fledged psychological or philosophical theory of beliefs must address the relationship between rationality and beliefs. It is enough to say that explaining how rationality can be integrated into the mind was the main motivation behind Fodor's (1975) language of thought hypothesis and Frege's (1956) views on thinking and language.

I will not explore the nature of rationality. It surpasses both the author's philosophical expertise and the readers' patience. For our purposes, let us accept that the core of the complex concept of rationality involves using beliefs, justifications, and logic to guide behaviour – judgments, decisions, actions – and to achieve goals (cf., e.g., Audi, 2001; Nozick, 1993).

It is debatable whether rationality is universal, what role context plays, or how to define different types of rationality (e.g., structural or practical). Nevertheless, it is widely accepted that rationality, in any form, requires norms. Rationality norms are rules that determine how we think, act, and make decisions to be considered rational. For instance, it is irrational to hold incoherent beliefs – such as believing that you are a great mathematician, that great mathematicians can count, and yet believing that you cannot count – since this contradicts the principle of non-contradiction. Similarly, it is irrational to follow a horoscope, as it violates the norm that one should not believe in something against the evidence.

Norms of logic are a subset of rationality norms. The latter also includes rules of probability and norms of decision theory, practical rules, such as guidelines for efficiency or basing judgments on evidence, etc. However, for the sake of brevity, throughout the paper, I refer to the concept of rationality norms, mainly focusing on the rules of logic.

For the purpose of analysis, I assume that the norms of rationality can influence our behaviour. For instance, based on the principle of non-contradiction, you may abandon one of the inconsistent beliefs and, based on the evidence, cease following a horoscope. If the norms of rationality could not influence our behaviour, a large part of research in cognitive psychology, logic, the philosophy of mind, not to mention common knowledge, would be at risk.

Now, a careful reader of Posłajko's (2024) ingenious book might shrug. The author does not discuss the topic of rationality. Why on earth should anyone care about the lengthy introduction on the relationship between rationality and beliefs if we are discussing the topic of the existence of beliefs? Moreover, a benevolent

reader of the book might argue that the connection between rationality and beliefs is secured in Posłajko's mild anti-realism framework. One might say that the topic of rationality is not relevant for being a mild anti-realist.

The core of Posłajko's sophisticated argument for mild anti-realism is based on a distinction between being real in terms of existence and being real in terms of possessing natural properties. According to the first understanding, being real involves being individuated by and used within explanatory contexts in scientific practice. Using Posłajko's examples, the concepts of race and gender refer to existing phenomena and are employed in scientific explanations. Therefore, race and gender exist.

According to the second understanding, being real means representing natural kinds and possessing natural properties. A kind is *natural* iff it reflects the structure of the natural world rather than our interests and actions. Sharing natural properties, as proposed by Lewis (1983), refers to the idea that objects sharing these properties are objectively similar; that natural properties are relevant in causal explanations; and that they can be defined in terms of fundamental natural properties. Atoms are considered real because they meet these criteria. The concepts of race and gender probably do not meet them. Therefore, race and gender are not considered real, at least in the same sense as atoms are.

The main idea of the book is that we can apply this distinction to beliefs. Posłajko navigates between the pitfalls of eliminativism and industrial-strength realism, arguing that, just as race and gender, beliefs exist. However, they do not possess natural properties. Therefore, they are not real.

The same distinction swiftly applies to the idea of rationality. Do norms of rationality exist? I see no good reason to deny it. Do norms of rationality have natural properties? Not really. Therefore, just as one can be a mild anti-realist about beliefs, one can also be a mild anti-realist about rationality. Although it says little about the nature of the connection between rationality and beliefs, it makes it conceptually plausible that these two ideas can be described within the same anti-realist framework. The case is settled.

I argue that this conclusion is flawed. I contend that recognising the influence of norms of rationality on reasoning and actions requires us to adopt a realist perspective on beliefs. In essence, beliefs are indispensable in explaining how the norms of rationality can influence our behaviour and, therefore, must be considered real in terms of possessing natural properties. Since my argument partly resembles the Quine-Putnam indispensability argument for realism in the philosophy of mathematics, I call it the rational indispensability argument for realism about beliefs.

*Main thesis:* If norms of rationality were to be applicable and shape human behaviour, then beliefs must be real in terms of possessing natural properties.

In short, I argue that our best theories of reasoning in cognitive psychology assume that rationality norms can influence our behaviour. This assumption involves specific ontological commitments. The ontological commitments of a theory are the kinds of entities that must exist for the theory to be true. The ontological commitments of our theories of reasoning are that beliefs mediate between norms and behaviour, and, thus, are causally efficacious and strictly individuable; therefore, they are real.

In light of the rational indispensability argument, mild anti-realists can formulate three kinds of responses. They can either argue that there are good reasons not to accept the conclusion; they can deny that norms of rationality apply to human behaviour; or, lastly, they can defend their position by claiming that the distinction between mild anti-realism and realism is merely a matter of definition. I argue that avoiding anti-realist positions is the most convincing choice.

I proceed as follows. I start by presenting Wundt's argument for psychologism in the debate on the nature of laws of logic. Although this argument may not be sufficient to establish that laws of logic are psychological entities, it provides us with valuable insights into the relationship between normative and descriptive properties. Building on Wundt's argument, in the next section, I introduce the rational indispensability argument for realism about beliefs. I contend that if norms were to influence our behaviour, then we must recognise that beliefs exist, are causally efficacious and are strictly individuable. Therefore, beliefs are real in terms of possessing natural properties. In the final section, I outline possible responses to the rational indispensability argument and demonstrate that they fall short.

## 2. Wundt's Argument

These days, philosophers love naturalism. However, there was a time when, and a place where naturalism was a philosophical non-starter. Just before the Great War, German-speaking philosophers were preoccupied with the so-called *Psychologismusstreit*. The heated discussion revolved around whether logic is part of psychology. Psychologists<sup>1</sup> answered yes. Nonetheless, the central figures of this controversy, Frege and Husserl, strongly opposed any attempts to naturalise logic. Long story short, after fierce critiques from both philosophers, the term 'psychologism' became an insult, denoting the fallacy of confusing psychological entities with non-psychological ones.

This paper does not aim to evaluate the advantages and disadvantages of psychologism, especially since it has never been a precisely defined stance (Beiser, 2014; Gray, 2008). Instead, it functions more as a collection of arguments that

---

<sup>1</sup> Notably, one of the most prominent psychologists was also a founding father of modern logic, George Boole. The aim of his groundbreaking work on propositional calculus was to study the laws of reasoning: "The design of the following treatise is to investigate the fundamental laws of those operations of the mind by which reasoning is performed" (Boole, 1854/1951, p. 1).

could be labelled psychologistic. Likewise, I do not intend to assess the validity of Frege and Husserl's arguments. Instead, I will present one of the strongest arguments in favour of psychologism, with the sole aim of using it to support the realism of beliefs. Since it was originally introduced by Wundt (1880/1883), let us refer to it as Wundt's argument.

The structure of Wundt's argument is quite clear. The main premise states that any normative discipline setting prescriptive rules for behaviour must be based on a descriptive discipline. The idea is that for a rule to be valid, there must be a descriptive foundation outlining the conditions under which the rule applies. Let us compare a legal rule requiring moving faster than the speed of light and the one mandating turning left. Only the second one is binding. The first one is invalid, since moving faster than the speed of light, according to all that we know about the world, is physically impossible.

The second premise is also quite uncontroversial. It asserts that logic is a normative discipline that prescribes rules for thinking. For example, if from  $p \rightarrow q$  and  $\neg p$  I infer that  $\neg q$ , I commit the inverse error and should reconsider my reasoning. I am bound to do so because the rules of logic instruct me to act accordingly.

The final premise asserts that only one science can serve as a descriptive foundation for logic. It is psychology.

From these three premises, Wundt concludes that logic must be based on psychology.

#### *Wundt's Argument*

(P1) Normative disciplines that establish prescriptive rules for behaviour are founded on descriptive disciplines.

(P2) Logic is a normative discipline concerning rules of reasoning (laws of thought).

(P3) Psychology is the only descriptive science that can form a basis for logic.

---

(C) Logic is based on psychology.

The strength of Wundt's argument was recognised very early by both Frege and Husserl. Despite claims sometimes made (e.g., Føllesdal, 1958, p. 49), Frege and Husserl never argued that the distinction between psychology and logic rests on the is-ought distinction. Frege (1893) argues that logic includes both descriptive rules, such as if it is true that  $a$ , then  $a$ , and prescriptive rules, like if you accept the truth of  $a$ , then you must accept  $a$ . However, the descriptive rules form the foundation for the prescriptive ones. According to Frege, the fallacy is concealed in the third premise. It is the confusion between being true, which is an objective property and belongs to the realm of logic, and what is held to be true,

which is subjective and falls under psychology, that underpins the psychological fallacy.

Husserl is even more straightforward. He recognises that normative disciplines have descriptive foundations (1975, §§14–16) and openly criticises the idea that psychology and logic can be distinguished by the is-ought distinction (1975, §17). On this matter, he agrees with psychologists and asserts that thought as it ought to occur is a special case of thought as it actually occurs. He dismisses psychologism due to its consequences, believing it inevitably results in the pitfalls of relativism and scepticism.

Clearly, the aim of the paper is not to settle the psychologism debate nor to assess the validity of Frege and Husserl's arguments. It is plausible, following Frege, that psychologists have been misled by the confusion surrounding the ambiguous concept of laws of thought. It may be that psychologists confuse two different types of enterprises: developing a theory of deductive logic concerning the relation between truth-preserving entities, on one side, and a theory of the psychological principles of belief revision, on the other. Citing Harman (1984, p. 107): "Logical principles are not directly rules of belief revision. They are not particularly about belief at all."

Therefore, Wundt does not need to be correct about the conclusion. Nonetheless, the first two premises of Wundt's argument remain valuable to retain.

The main idea of Wundt's argument is that if logic were to establish rules for our behaviour, it must be based on a descriptive foundation that explains why these rules are applicable. In other words, if logic is to prescribe reasoning rules, it must be consistent with the principles of the psychology of reasoning. We can refer to this as the "truth" of Wundt's argument. This thesis comes with two significant caveats.

Firstly, the "truth" of Wundt's argument does not require us to believe that logic has a privileged role in reasoning or that its principles form the basis of thinking. Suppose one believes that  $p$  and  $p \rightarrow q$ . It does not necessarily force me to believe that  $q$ . For example, believing that  $q$  can be at odds with empirical evidence, in which case it could be irrational to form a belief that  $q$ .

Similarly, suppose some rule of logic requires considering all alternatives of our scientific hypothesis before reaching a conclusion. Although the content of this logical rule does not seem very different from the rule of Modus tollens, due to the psychological limits of our cognition, attempting to follow this rule could render any hypothesis undecidable, thereby invalidating the rule.

Thus, logical rules cannot be identified with the norms of rationality. They cannot be identified with psychological reasoning rules either. As Frege and Husserl indicated, this would be a clear case of the mistaken identification of non-psychological entities with psychological ones. Logical rules are, at best, an idealisation of both rationality norms and psychological rules.

The "truth" of Wundt's argument simply involves recognising an interesting normative connection between logic and human reasoning. In other words, the principles of logic are *applicable* and can shape the structure of human reasoning.

It does *not* require us to believe that the principles of logic are identical to the psychology of reasoning.

The rules of logic can influence our minds without being identified with the psychological mechanisms involved. For example, consider that human reasoning aims to accurately represent the world, and that this goal cannot be achieved if beliefs contain inconsistencies. Logic is a theory about the relationships between propositional contents. Therefore, understanding the rules of logic can be important for eliminating inconsistencies in our beliefs.

Furthermore, recognising the theoretical applicability of the rules of logic is crucial if we want to keep logic useful for understanding the world. If someone believed that logic has no real-world application at all, it would reduce logic to a childish game, similar to puzzles. We all enjoy puzzles, just as we enjoy chess. However, unlike departments of logic, universities do not need departments dedicated to puzzles and chess.

Secondly, the “truth” of Wundt’s argument can be understood in two ways. On the one hand, it reduces to the formula ascribed to Kant that “ought implies can”, expressed in deontic logic with the axiom  $OA \rightarrow \Diamond A$ . Thus, if we are obliged to perform a certain action, then it must be possible to perform it, and, by the rules of Modus tollens, if it is not possible, then it is omissible. For example, we do not expect newborns to follow the rules of logic, since their cognitive skills are not sufficiently developed to follow these rules.

On the other hand, the “truth” of Wundt’s argument asserts that if there is a normative link between logic and psychological facts of human reasoning, then a way of bridging the gap between them must exist. Psychology explains how the mind functions causally. Since psychology underpins the applicability of logical norms, they must be integrated into the causal mechanisms of the human mind. Without this integration, it would be difficult to understand how these rules can be valid for human reasoning or how they influence our behaviour. In what follows, I mainly focus on this second interpretation of the argument.

And obviously, Wundt’s argument says very little, if anything, about how to bridge this gap between rules of logic and reasoning. It does not identify any crucial causal factors that facilitate the transfer from the content of a logical rule to applying this rule in actual reasoning. It only states that this causal transfer, in principle, should be possible if the rules of logic were applicable to human reasoning.

In the next section, I will argue that recognising the “truth” of Wundt’s argument helps us to develop an argument for the realism of beliefs. I will demonstrate that the applicability of the norms of rationality requires beliefs to be causally effective and strictly individuable, and, therefore, real in Pośłajko’s sense.

### **3. The Rational Indispensability Argument for the Realism of Beliefs**

Let us move on to the second stage of the argument. In the philosophy of mathematics, there is a long-standing debate about the existence of mathematical

entities. One of the most influential arguments supporting mathematical realism is the so-called Quine-Putnam indispensability argument (Putnam, 1979; Quine, 1980a-b). In this section, I will formulate an analogous argument for the reality of beliefs. Because it pertains to the indispensability of beliefs for the applicability of the norms of rationality, I will refer to it as the rational indispensability argument for the realism of beliefs.

Let us begin with the Quine-Putnam indispensability argument. According to the first premise of the argument, we should have ontological commitments to all and only the entities that are indispensable to our best scientific theories. The second premise states that mathematical entities are indispensable to our best scientific theories. Therefore, we should have ontological commitments to mathematical entities and, consequently, be realists about them.

### *The Quine-Putnam Indispensability Argument*

(P1) We ought to have ontological commitments to the entities that are indispensable to our best scientific theories.

(P2) Mathematical entities are indispensable to our best scientific theories.

---

(C1) We ought to have ontological commitments to mathematical entities.

(C2) We ought to be realists about the existence of mathematical entities.

Two clarifications are necessary. First, the concept of indispensability should be understood as the idea that mathematical entities cannot be eliminated from our best theories because doing so would make these theories less attractive. They would lack empirical success, explanatory power, and unifying ability, among other qualities. Clearly, this is a matter of mathematics.

Secondly, although the second premise seems non-controversial, the first requires support. The validity of the first premise derives from accepting confirmational holism, which holds that scientific theories are confirmed and disconfirmed as wholes (Quine, 1980b). If a theory is confirmed by empirical findings, the entire theory is confirmed. Therefore, if mathematical entities are employed in a theory, their existence is also affirmed.

Clearly, there is no need to delve into the metaphysics of mathematics. Nor is it necessary to analyse the responses to the Quine-Putnam indispensability argument. For this paper, it suffices to observe that a similarly structured argument for the reality of beliefs can be formulated. Let me clarify this.

The core of the rational indispensability argument holds that the concept of belief is a technical term used in theories of reasoning within cognitive psychology to explain how rationality requirements can influence our behaviour. If these rationality requirements are to be applied—and we accept that they are—then we must also recognise that beliefs, such as my acceptance of the truth of the Modus tollens rule, can affect our behaviour. This, in turn, suggests that beliefs must

have causal powers and generally remain consistent in content, which amounts to claiming they are real in Posłajko's sense.

The structure of the argument, in simplified form, is as follows. The first premise remains unchanged and maintains that we ought to make ontological commitments regarding the entities our best theories require. The second premise argues that beliefs are indispensable to theories explaining the applicability of norms of rationality to human behaviour. Therefore, we ought to have ontological commitments to beliefs and be realists about them.

*The Rational Indispensability Argument (Simplified)*

(P1) We ought to have ontological commitments regarding the entities required by our best theories.

(P2) Beliefs are indispensable to theories explaining the applicability of norms of rationality to human behaviour.

---

(C1) We ought to have ontological commitments to beliefs.

(C2) We ought to be realists about the existence of beliefs.

Explaining the second premise is essential. Note that if the argument only claimed that we use the concept of beliefs in our scientific theories, it would face two counterarguments. The first is that belief is a folk psychological concept that can and should be replaced by a more precise one. In other words, beliefs are dispensable. This forms the core of the eliminative strategy concerning the metaphysics of beliefs. The second counterargument is that if the argument simply asserts that beliefs must exist, it does not imply that they are real in terms of possessing natural properties. This is the main idea of Posłajko's mild anti-realist approach. However, the purpose of the argument is to show that beliefs are indispensable and real in Posłajko's sense. Let me start with the claim of indispensability.

According to eliminativists, the concept of beliefs is a folk psychological term mainly used in theories of other minds. In brief, we assume beliefs exist to explain others' behaviour. However, according to eliminativists, the concept of belief is a prescientific term used as a shortcut in reasoning and should, in principle, be replaced by a more sophisticated concept.

However, this objection does not apply to the rational indispensability argument. In logic and in theories of reasoning in cognitive psychology, the concept of belief is not a folk-psychological one. Instead, it is a technical term referring to attitudes towards propositional content. I do not know many folks, but I doubt they would be happy to substitute the expression "I believe that p" with "I have a cognitive propositional attitude that p". Granted, there are many things we do not know about propositional attitudes. And yet, we do know something about them. We can describe the relationship between different attitudes. We know they are related to truth and so on. In this technical sense, the concept of belief is indis-

pensable, as any attempt to eliminate it would make our best theories of reasoning in logic and cognitive psychology less attractive.

Eliminativists might argue that this response can be easily challenged by distinguishing between two different understandings of the concept of belief. Psychologists use one, while philosophers use the other. Philosophers use the technical term, which pertains to idealised entities, such as propositional attitudes; psychologists refer to causally grounded mental states. Their objections pertain only to the psychological understanding of this term, whatever such understanding might be. However, although distinctions are generally useful, they do not resolve the core issue.

According to the rational indispensability argument, beliefs, defined as attitudes towards propositional content, can causally influence certain psychological states. If these psychological states were categorically different from propositional attitudes, then any attempt to explain the causal influence of propositional attitudes on these states would risk making a categorical error. However, we assume that propositional attitudes do causally affect some psychological states; therefore, philosophical and psychological understandings of the belief concept cannot belong to different logical categories. If we presuppose that there is a way to bridge the gap between propositional attitudes and psychological states, philosophical and psychological understandings of the belief concept cannot be categorically different. Let me revisit this point shortly.

According to mild anti-realists, the rational indispensability argument might not succeed. They could accept the premises and the conclusion but remain sceptical about the reality of the beliefs. Following Posłajko, they may argue that the argument only shows that beliefs exist, which they willingly endorse, but that they are not real in the sense of lacking natural properties. According to mild anti-realists, beliefs are neither strictly individuable, causally efficacious, nor definable in terms of fundamental natural properties. Can mild anti-realists rest easy? Well, easy does it!

Let us reconsider Wundt's argument. According to its "truth", if logic, in particular, and rationality norms, in general, were to influence human reasoning, then there must be a way to bridge the gap between the norms of rationality and the psychological mechanisms of reasoning. If there were no way to bridge the gap, then the norms of rationality would be useless in altering our behaviour. Yet, we reluctantly assume they do have a use.

What are our ontological commitments regarding the applicability of rationality norms? Norms of rationality can influence our behaviour only if we have cognitive access to them. For example, we need to know the Modus tollens rule to apply it to our reasoning. Even though we do not have to be aware of the exact formulation of the rule, we are required to know that if we believe that  $p \rightarrow q$  and  $\neg q$  then it would be incorrect to believe that  $p$ .

Moreover, we must adopt a special attitude towards propositional contents. We must hold that the Modus tollens rule is valid and take for granted that  $p \rightarrow q$ , and  $\neg q$ . We cannot doubt it or deny it. In other words, to follow the rule of Mo-

dus tollens, we are required to possess a specific attitude towards the proposition that it is not true that  $p$  if  $p \rightarrow q$  and  $\neg q$ . It is another way of saying that I have a *belief* that  $\neg p$ . Thus, the applicability of rationality norms implies the existence of beliefs.

Furthermore, we must recognise that norms of rationality influence our reasoning. Only through this influence can we establish the validity of these norms. If they could not affect our reasoning, they would be deemed inapplicable and pointless.

The only way that norms of rationality can influence our reasoning is by being part of a causal chain. For instance, being aware of  $p \rightarrow q$  and  $\neg q$ , as well as the validity of the Modus tollens rule, makes one aware that  $\neg p$  and, in turn, *can* (though it does not have to) change one's behaviour. Therefore, the applicability of the norms of rationality implies not only that beliefs exist, but also that they are causally efficacious. In a word, if one argues that the applicability of the norms of rationality requires us to accept the existence of beliefs and that these norms can influence our reasoning, then it follows that beliefs must possess causal powers. Let us call this the no-gaps argument. Allow me to explain it.

Suppose you believe that  $p \rightarrow q$  and  $\neg q$ , as well as the validity of the Modus tollens rule. Next, suppose it does indeed make you believe that  $\neg p$ . In this case, you start with a set of propositional attitudes towards the content  $p \rightarrow q$ ,  $\neg q$ , and the validity of the Modus tollens rule. Let us call it the set of beliefs  $A$ . You end with a set of propositional attitudes towards the content of a set  $A$ , plus the attitude towards the content that  $\neg p$ . Let us call it  $A^*$ . The causal relation between  $A$  and  $A^*$  may not be clear to us. Yet, assuming that we are naturalists, we are bound to hold that there are no causal gaps. There must be some sort of causal relationship between  $A$  and  $A^*$ . If not, you must accept some sort of supernatural interaction between our attitudes towards propositions. Therefore, assuming you are a naturalist, beliefs are causally efficacious.

Holding that beliefs are causally efficacious does not oblige us to accept the language of thought hypothesis. It has never been, contra Fodor, the only game in town. Let me provide two examples of possible theories. First, the idea that logic must be causally embedded within human reasoning was the main reason why Frege was interested in language. In short, Frege believes that language is necessary for thinking, as only through language can we grasp the content of our thoughts. If words can influence our behaviour, and they in principle can, then beliefs, through language, can do the same. Second, according to dispositionalism, having beliefs is equivalent to manifesting a certain pattern of behaviour. Belief is a relational property that manifests a specific structure of physical events. Generally, relational properties have causal powers. For example, a poorly placed balance point can cause the bridge to collapse. Similarly, patterns of behaviour can give rise to other patterns. For dispositionalists, the causal powers of beliefs are a feature, not a bug.

Thus, not only must we assume that beliefs are causally efficacious, but we also have theories that attempt to explain how this is possible.

Finally, the applicability of the norms of rationality requires that beliefs be strictly individuatable. This means that the content of our beliefs should remain stable across time and between individuals. For example, to follow the rule of Modus tollens and expect others to do the same, I must assume that it is the same propositional attitude and the same rule content that applies universally across time. If rules and attitudes towards them were not stable, it would be impossible to determine whether one is following rules, and therefore, they would be inapplicable.

Suppose I follow the Modus tollens rule and expect others to do likewise. Clearly, to adhere to this rule, I must assume that its content is stable and distinguishable from other contents. It cannot be the case that at a time  $t_1$ , I accept the truth of the statement that if a conditional statement  $p \rightarrow q$  is true, and the consequent is false, then the antecedent must also be false, and at a time  $t_2$ , I hold that in the same case, the antecedent must be true.

Furthermore, to adhere to the Modus tollens rule, I must hold the same and distinguishable attitude towards its content. I must accept the truth of its content. Doubting or denying the truth of this rule counts as a different propositional attitude. Therefore, assuming that we can follow the Modus tollens rule, beliefs must be strictly individuatable.

To sum up, the applicability of the norms of rationality implies that beliefs are causally efficacious and strictly individuatable. The fully developed form of the rational indispensability argument can be presented as follows.

*The Rational Indispensability Argument (Fully Developed)*

(P1) We ought to have ontological commitments regarding the entities required by our best theories.

(P2) Beliefs are indispensable to theories explaining the applicability of norms of rationality to human behaviour.

(C1) We ought to have ontological commitments to beliefs (from P1-2).

(C2) We ought to be realists about the existence of beliefs (from P1-2).

(P3) Norms of rationality influence human reasoning (general assumption).

(P4) Applicability of the norms of rationality commits us to hold that (from Wundt's argument):

(P4.1) Beliefs are causally efficacious

(P4.2) Beliefs are strictly individuatable.

---

(C3) Beliefs exist and are causally efficacious and strictly individuatable.

Let us examine the final feature mentioned by Pośłajko: being definable in terms of fundamental natural properties. To my knowledge, it is the most debated property introduced by Pośłajko. Essentially, there is no consensus on what constitutes the most fundamental natural properties (e.g., Dorr and Hawthorne, 2013). Possessing spin can be regarded as such. Nonetheless, a significant grey area remains beyond that.

There are two problems with the condition of being definable in terms of fundamental natural properties. According to functionalists and dispositionalists, beliefs can be defined by their relational properties: their causal roles and behavioural patterns. Do relational properties count as being fundamental and natural?

I see no good reason why not. For example, according to the theory of relativity, the geometrical properties of space are considered primitive and among the most fundamental natural properties of space. According to Newtonian physics, energy is a relational *and* fundamental property. The topological structure of DNA is natural and influences the expression of genetic information. If we have no trouble agreeing on that, then we would be applying double standards if we deny this status to the relational properties of beliefs.

Furthermore, and most importantly, introducing the concept of fundamental natural properties appears to predetermine the outcome of the debate. We can agree with Lewis (1984) that the concept of naturalness aids in developing the idea of realism. We can also agree with him that natural properties are causally efficacious and build up the world. However, excluding relational properties from the set of natural properties is question-begging. If we exclude relational properties from the set of fundamental natural properties, then the debate over whether beliefs are real is effectively settled, since the only remaining positions are identity theory and the Fodorian industrial-strength realism. Non-Fodorian functionalism and dispositionalism are dismissed prematurely. Consequently, we could achieve an easy victory in the debate, but only through definitional tricks. Such victories bring no glory.

Therefore, it is not a good move to start with the idea of fundamental natural properties and then argue that mental entities proposed by some theories lack causal powers and cannot be individuated. Instead, it is more prudent to claim that if some mental events are causally efficacious and individuable, then they possess natural properties. According to the rational indispensability argument, beliefs are causally efficacious and individuable. Therefore, they possess natural properties and are real in Pośłajko's sense.

#### 4. Possible Responses

There may be at least three responses to the rational indispensability argument. First, one can accept the premises but reject the conclusion. If there is strong evidence against the conclusion, then it would be irrational to accept it. Second, one can argue that one of the premises is flawed, rendering the entire argument unsound. Third, one can accept the conclusion but claim that the argu-

ment overlooks an important aspect of the mild anti-realist position. Let us begin with the first.

According to the first response, as carefully described by Poślajko, there is strong evidence that the folk-psychological concept of belief does not refer to any mental entity that can possess causal powers and be strictly individuable. Let us start with being individuable. Poślajko (2024, p. 95), following Connors and Halligan (2015, p. 3), argues that in cognitive psychology, beliefs, although they share several common properties, are best seen as varying across different dimensions within these properties. For example, they can differ in their effects on cognition and behaviour. If they vary across dimensions, then they must lack natural properties and, therefore, are not real.

However, varying across dimensions does not imply that something lacks natural properties or is unreal. It simply indicates that it is a multidimensional concept. Velocity (but not speed) is a multidimensional concept that varies across different dimensions, yet this does not mean we cannot measure velocity, nor does it suggest that it is unnatural or unreal. Biodiversity is also a multidimensional concept that impacts the environment in various ways. Nevertheless, we can measure biodiversity, and no one should deny its reality. Being multidimensional and varying across dimensions is, at most, a sign of a coarse-grained concept. However, this is not problematic, as most scientific concepts are coarse-grained.

Poślajko's argument against the causal powers of beliefs is more sophisticated. He argues (2024, p. 98n.) that proponents of beliefs are unable to "provide an account of how contentful mental states might be seen as being genuinely causally active." (2024, p. 106). For the sake of brevity, I will not delve into the details of his argument. Instead, I will raise two doubts regarding his conclusion.

First, based on the no-gaps argument, if you are a naturalist and accept that the norms of rationality apply to reasoning, then you are compelled to recognise the causal relevance of beliefs. Admittedly, there is another story to tell about how this causal relationship operates. However, it is different to say that we do not understand how something works and that it cannot work.

Second, proponents of dispositionalism and functionalism seem to be immune to Poślajko's causal power argument. Dispositionalists and functionalists define beliefs in terms of relational properties of dispositions and causal roles. We can discuss in what sense relational properties can be causally efficacious. However, it is a reasonable and plausible option that they *are* causally effective (e.g., McKittrick, 2005). Therefore, the reasons to doubt the conclusion of the rational indispensability argument do not appear to be conclusive.

Let us consider the second type of response. One may oppose the rational indispensability argument by rejecting one of its premises. The most plausible option is rejecting the premise that norms of rationality apply to human reasoning. Since this response was suggested to me in a private conversation by Maja Kittel, I refer to it as Kittel's counterargument from a-rationality.

According to Kittel's counterargument, it is a philosophical wishful thinking to believe that norms of rationality apply to human behaviour. We wish for them to apply, but they only serve to justify the existence of courses in logic. Similarly, we argue that Santa exists to justify the tradition of gift-giving.

Kittel's counterargument can be understood in two ways. The first proposes that norms of rationality in general, and rules of logic in particular, are not the most effective tools for describing human reasoning psychology. Even if they were, it does not specify which types of rationality norms (such as practical or theoretical), and rules of logic (like classic, non-monotonic, or modal), rules of probability or decision theory, are most appropriate for that purpose. The second suggests that these norms and rules do not influence human reasoning. Let me begin with the first interpretation.

According to the indispensability argument, norms of rationality, including rules of logic, may, though they need not, influence human reasoning. However, this does not require us to believe that these norms and rules depict actual mechanisms of human reasoning and belief revision processes. Admittedly, it would be easier to understand how rationality norms are applied if they were part of human psychology. This is precisely what Wundt concludes in his argument. Nevertheless, the indispensability argument remains valid even if we reject Wundt's conclusion.

Norms of rationality and rules of logic do not necessarily concern beliefs at all. They might describe relations between propositional contents and/or actions. At most, they could be seen as idealisations of the real process of belief revision.

What matters for the indispensability argument is that norms of rationality in general, and rules of logic in particular, apply to human reasoning not in terms of describing it, but in terms of affecting it. We can be guided by rationality norms and follow rules of logic. Metaphorically speaking, even if we are not rational animals, we sometimes act as if we were (and this is what makes us rational). Acting as if we were rational, however, commits us to believe that beliefs are real.

Therefore, regarding the indispensability argument, it is irrelevant which rationality norms or rules of logic best describe human reasoning and belief revision processes. It could be classical logic (cf. e.g., Stenning and Lambalgen, 2008), but it does not have to be (cf. e.g., Bishop and Trout, 2005). It might also be a combination of problem-solving techniques. The only premise we need to accept is that, on occasion—though rarely—people do use some, but not all, norms of rationality in reasoning.

The second interpretation of Kittel's argument challenges this very premise. Kittel's counterargument is supported by extensive empirical evidence on the irrationality of human reasoning. Even this paper begins by referencing the renowned Wason's selection task paradigm and the Heuristics and Biases programme in psychology. Haven't they demonstrated that rationality is merely a myth?

Granted, most subjects fail in Wason's selection tasks. They rely on dependable heuristics rather than deductive reasoning. Nevertheless, we should not be overly pessimistic about this.

Let us examine Wason's selection tasks. You are presented with four cards on a table, each having a number on one side and a colour on the other. The visible sides show the digits 3 and 8, along with the colours blue and red. Which card(s) should you turn over to verify the rule that if a card displays an even number, then its opposite side must be blue?

After brief consideration, you can easily solve this task using Modus ponens and Modus tollens. The correct answer is to flip the 8 card and the red card. However, less than 10% of the subjects in the original study answered correctly. Isn't this definitive proof that we are irrational and that logic has no influence on our reasoning? No, it is not. Even though correct answers were uncommon, they did occur. Wason's selection test shows that we struggle with nonintuitive tasks. Still, no one claims that logic must be intuitive. And yet, some people do use logic to reason. This makes the applicability of the rules of logic even more remarkable.

Nonetheless, there is one final way to challenge the premises of the argument. One can argue that, although norms of rationality apply to human reasoning, their applicability does not necessarily mean that beliefs are real (P4). Consider a possibly existing legal norm banning witchcraft. Does its existence imply that witchcraft is real? Not necessarily. Similarly, even if rationality norms are binding, they do not force us to believe that beliefs are real.

Well, is that so? No! The difference between the legal rule banning witchcraft and the Modus tollens rule is that only the latter is valid. Banning witchcraft, although such a rule could exist, is not applicable because, to the best of our knowledge, witchcraft does not exist. The rule may exist, but it is not valid. Nevertheless, it would be binding if we discovered that witchcraft is real.

In contrast, the Modus tollens rule exists and, to the best of our knowledge, is valid and applicable. If it is valid and can be applied, then (according to Wundt's argument) it commits us to the view that it can be integrated with the causal mechanism of reasoning. It can only be integrated if we adopt certain propositional attitudes towards its content, which boils down to holding that we possess beliefs. Therefore, beliefs must be real.

Finally, let us consider the last response. The proponents of mild anti-realism may accept the conclusion of the rational indispensability argument, even if it means biting the bullet. However, they might still wish to preserve the spirit of mild anti-realism. According to this view, recognising that beliefs are real in both senses mentioned by Posłajko overlooks an important distinction between beliefs and other mental states. As Posłajko argues, beliefs are not simply mental objects that exist in some Cartesian mental space. Asking about the nature of beliefs is not the same as asking about natural properties of the mind. Differentiating between existing and being real helps us understand that beliefs exist, but they do so differently from atoms and quarks. Similar to the concept of gender, they are

constructed for scientific purposes. Therefore, beliefs are largely constructed concepts (see, e.g., Mathews, 2013) and do not constitute natural kinds.

Now, according to most realists, excluding perhaps the proponents of the identity theory, beliefs exist but they also exist differently from atoms and quarks. Therefore, the difference between realists and mild anti-realists can be subtle and might simply be a matter of using different terms.

Ecumenism is a virtue, but sometimes it can lead us astray from the path of salvation. The success of the last response depends on how we understand being constructed. On the one hand, being constructed may mean not referring to any object of a natural kind. This is where mild anti-realists and some realists converge. On the other hand, being constructed could mean that a category is a product of how we describe the world. That is what interpretivists would argue.

However, there is another way to develop the idea of being constructed. It could mean being a product of our measurement practices. For example, being 10 on the Apgar scale is a product of our measurements. This property did not exist before the introduction of the Apgar scale. Nonetheless, being 10 on the Apgar scale, although multidimensional, remains an individuatable property and does possess causal powers. That is what the realists like Dennett (1991) support.

According to the rational indispensability argument, if norms of rationality are to influence behaviour, beliefs must exist and possess certain natural properties. Admittedly, they do not need to exist like atoms and quarks; they can be more akin to a score of 10 on the Apgar scale. Nonetheless, in all these cases, they must be causally efficacious and individuatable. If they were not, then, according to the rules of *Modus tollens*, norms of rationality would be ineffective.

Therefore, we do not quarrel over words. We discuss the metaphysics of beliefs and the essence of rationality. That is why we should be realists about beliefs.

## 5. Conclusion

In this paper, I have examined the intricate relationship between rationality and beliefs, arguing that beliefs are essential for explaining how norms of rationality shape human behaviour. I start by discussing the normative role of beliefs and how rationality constrains our beliefs. Then, I introduce the concept of mild anti-realism, which suggests that beliefs exist but lack natural properties. I criticize this view, asserting that recognising the influence of rationality norms on reasoning requires us to be realists about beliefs. I present the rational indispensability argument, claiming that beliefs are indispensable for the application of rationality norms and therefore must be real. I argue that the applicability of rationality norms commits us to the existence of beliefs that are causally efficacious and strictly individuatable. Consequently, beliefs are real in the sense defined by Posłajko.

And although I do not agree with Pośłajko's main thesis, I do find his book both challenging and thought-provoking. There is no better recommendation for the book than discussing it. Furthermore, I do share Pośłajko's view that we are misled by futile attempts to localise beliefs as some objects existing in the Cartesian theatre. The only point where I differ is that beliefs are not real. I have argued that we have good reasons to treat them as real. Whether they are more like the concept of gender or like being 10 on the Apgar scale, and what that even means, is a different matter for discussion.

## REFERENCES

- Audi, R. (2001). *The Architecture of Reason: The Structure and Substance of Rationality*. Oxford: Oxford University Press.
- Beiser, F. C. (2014). *The Genesis of Neo-Kantianism, 1796–1880*. Oxford: Oxford University Press.
- Bishop, M. A., Trout, J. D. (2005). *Epistemology and the Psychology of Human Judgment*. Oxford: Oxford University Press.
- Boole, G. (1951). *An Investigation of the Laws of Thought, on Which Are Founded the Mathematical Theories of Logic and Probabilities*. New York, NY: Dover.
- Burge, T. (2010). *Origins of Objectivity*. Oxford: Oxford University Press.
- Bykvist, K., Hattiangadi, A. (2007). Does thought imply ought? *Analysis*, 67(296), 277–285.
- Chater, N., et al. (2018). Mind, Rationality, and Cognition: An Interdisciplinary Debate. *Psychonomic Bulletin & Review*, 25, 793–826.
- Ciecierski, T. (2017). Attitudes and Normativity. *Axiomathes*, 27(3), 265–283.
- Davidson, D. (1970). Mental Events. *Experience and Theory*, 44, 43–64.
- Dennett, D. C. (1987). *The Intentional Stance*. Cambridge, MA: MIT Press.
- Dennett, D. C. (1991). Real Patterns. *Journal of Philosophy*, 88(1), 27–51.
- Dorr, C., Hawthorne, J. (2013). Naturalness. In K. Bennett, D. W. Zimmerman (Eds.), *Oxford Studies in Metaphysics* (pp. 3–77). Oxford: OUP.
- Elqayam, S., Evans, J. St. B. T. (2011). Subtracting “Ought” From “Is”: Descriptivism Versus Normativism in the Study of Human Thinking. *Behavioral and Brain Sciences*, 34(5), 233–248.
- Engel, P. (2018). The Doxastic Zoo. In A. Coliva, P. Leonardi, S. Moruzzi (Eds.), *Eva Picardi on Language, Analysis and History* (pp. 297–316). London: Palgrave Macmillan.
- Fodor, J. A. (1975). *The Language of Thought*. New York: Cromwell.
- Føllesdal, D. (1958). *Husserl und Frege: Ein Beitrag zur Beleuchtung der Entstehung der phänomenologischen Philosophie*. Oslo: Aschehoug.
- Frege, G. (1893). *Grundgesetze der Arithmetik: Begriffsschriftlich Abgeleitet* [Volume 1]. Jena: Pohle.
- Frege, G. (1956). The Thought: A Logical Inquiry. *Mind*, 65(259), 289–311.

- Gigerenzer, G. (1993). The Bounded Rationality of Probabilistic Mental Models. In K. I. Manktelow, D. E. Over (Eds.), *Rationality: Psychological and Philosophical Perspectives* (pp. 284–313). London: Routledge.
- Gigerenzer, G. (2000). *Adaptive Thinking*. New York: Oxford University Press.
- Gigerenzer, G. (2015). *Simply Rational: Decision Making in the Real World*. Oxford: Oxford University Press.
- Gray, J. (2008). *Plato's Ghost: The Modernist Transformation of Mathematics*. Princeton: Princeton University Press.
- Hahn, U. (2025). Human Rationality. *Annual Review of Psychology*, 77, 193–221.
- Harman, G. (1984). Logic and Reasoning. *Synthese*, 60(1), 107–127.
- Helton, G. (2020). If You Can't Change What You Believe, You Don't Believe It. *Noûs*, 54, 501–526.
- Husserl, E. (1975). *Logische Untersuchungen. Erster Band: Prolegomena zur reinen Logik*. In E. Holenstein (Ed.), *Husserliana XVIII*. The Hague: Nijhoff.
- Knauff, M., Spohn, W. (2021). Psychological and Philosophical Frameworks of Rationality—A Systematic Introduction. In M. Knauff, W. Spohn, *The Handbook of Rationality* (pp. 18–84). Cambridge, MA; London: The MIT Press.
- Lewis, D. (1983). New Work for a Theory of Universals. *Australasian Journal of Philosophy*, 61(4), 343–377.
- Lewis, D. (1984). Putnam's Paradox. *Australasian Journal of Philosophy*, 62(3), 221–236.
- Matthews, R. J. (2013). Belief and Belief's Penumbra. In N. Nottelmann (Eds.), *New Essays on Belief* (pp. 100–123). London: Palgrave Macmillan.
- McKittrick, J. (2005). Are Dispositions Causally Relevant? *Synthese*, 144, 357–371.
- Nozick, R. (1993). *The Nature of Rationality*. Princeton, NJ: PUP.
- Oaksford, M., Chater, N. (2007). *Bayesian Rationality: The Probabilistic Approach to Human Reasoning*. Oxford: Oxford University Press.
- Posłajko, K. (2024). *Unreal Beliefs: An Anti-Realist Approach in the Metaphysics of Mind*. London: Bloomsbury.
- Putnam, H. (1979). What is Mathematical Truth. In *Mathematics Matter and Method: Philosophical Papers* [Volume 1, 2nd Edition, pp. 60–78]. Cambridge: Cambridge University Press.
- Quine, W. V. O. (1980a). On What There Is. In *From a Logical Point of View* [2nd Edition, pp. 1–19]. Cambridge, MA: Harvard University Press.
- Quine, W. V. O. (1980b). Two Dogmas of Empiricism. In *From a Logical Point of View* [2nd Edition, pp. 20–46]. Cambridge, MA: Harvard University Press.
- Schurz, G., Hertwig, R. (2019). Cognitive Success: A Consequentialist Account of Rationality in Cognition. *Topics in Cognitive Science*, 11(1), 1–30.
- Shah, N., Velleman, J. D. (2005). Doxastic Deliberation. *The Philosophical Review*, 114(4), 497–534.
- Simon, H. A. (1990). Invariants of Human Behavior. *Annual Review of Psychology*, 41, 1–19.
- Stanovich, K. E. (1993). Dysrationalia: A New Specific Learning Disability. *Journal of Learning Disabilities*, 26(8), 501–515.

- Stanovich, K. E., West, R. F. (2000). Individual Differences in Reasoning: Implications for the Rationality Debate? *The Behavioral and Brain Sciences*, 23(5), 645–726.
- Stenning, K., Lambalgen, M. van. (2008). *Human Reasoning and Cognitive Science*. Boston: MIT Press.
- Sturm, T. (2012). The “Rationality Wars” in Psychology: Where They Are and Where They Could Go. *Inquiry*, 55(1), 66–81.
- Tversky, A., Kahneman, D. (1974). Judgments Under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124–1131.
- Wason, P. C. (1968). Reasoning About a Rule. *Quarterly Journal of Experimental Psychology*, 20(3), 273–281.
- Wundt, W. (1880/1883). *Logik. Eine Untersuchung der Prinzipien der Erkenntnis und der Methoden wissenschaftlicher Forschung* [Vols. 1, 2]. Stuttgart: Enke.
- Zangwill, N. (2005). The Normativity of the Mental. *Philosophical Explorations*, 8(1), 1–19.