



# Can the Epistemic Basing Relation be a Brain Process?

Dwayne Moore<sup>1</sup>

Received: 6 December 2022 / Accepted: 17 December 2022  
© The Author(s), under exclusive licence to Springer Nature B.V. 2023

## Abstract

There is a difference between having reasons for believing and believing for reasons. This difference is often fleshed out via an epistemic basing relation, where an epistemic basing relation obtains between beliefs and the actual reasons for which those beliefs are held. The precise nature of the basing relation is subject to much controversy, and one such underdeveloped issue is whether beliefs can be based on brain processing. In this paper I answer in the negative, providing reasons that the basing relation must be a specific psychological level relation between mental states, rather than being a brain process.

**Keywords** Justification · Reasons and Causes · Basing Relation · Doxastic Justification

There is a difference between having reasons for believing and believing for reasons. That Sonya will notice him is one reason for Trent to believe he should ask questions in class, but the reason for which he actually believes he should ask questions in class is that the professor is grading on participation. This difference is often fleshed out via an epistemic basing relation, where an epistemic basing relation obtains between beliefs and the actual reasons for which those beliefs are held. The precise nature of the basing relation is subject to much controversy, and one such underdeveloped issue is whether beliefs can be based on brain processing. In this paper I answer in the negative, providing reasons that the basing relation must be a specific psychological level relation between mental states, rather than being a brain process.

---

Dwayne Moore  
dwayne.moore@usask.ca

<sup>1</sup> Philosophy Department, University of Saskatchewan, 9 Campus Drive, S7N 5A5, Saskatoon, Saskatchewan, Canada

This paper is divided into five parts. In the first section I define the basing relation as a justifying and causal relation obtaining between someone's reasons for belief and the belief itself. In Section Two I provide three reasons that this basing relation is a psychological level relation obtaining between mental states. I then discuss several prototypical instances of the failure of proper basing, showing how bad basing occurs when beliefs are caused by some source that is not a psychological level justifying reason. In Section Four I consider a volley of cases where atypical brain processing follows the same trajectory of bad basing discussed in Section Three. Finally, in Section Five, I argue that beliefs caused by typical brain processes are not properly based, though I leave open the possibility that proper basing can be realized in, or pass through, brain processing.

## 1 The Basing Relation

Donald Davidson demarcates a distinction between reasons for acting and acting for reasons. Coach Smith has two reasons to put his daughter in the game—because it is her turn to play, and because he wants her to score the winning goal. Since he never shows favoritism on the field, he does not put her in the game so she can score the winning goal, rather he only puts her in because it is her turn to play. This difference between reasons for acting and acting for reasons, Davidson insists, is that we act for reasons when those reasons cause us to act: “a person can have a reason for an action, and perform the action, and yet this reason not be the reason why he did it. Central to the relation between a reason and an action it explains is the idea that the agent performed the action *because* he had the reason” (Davidson 1963, 691). Motivated by these types of considerations, Davidson contributes to establishing the causal theory of action as the standard account of action, according to which actions are caused by reasons.

A parallel distinction between reasons for belief and believing for reasons appears in epistemology. One juror believes truly, based on the substantial evidence she heard, that the defendant is innocent. Another juror hears the same evidence but remains undecided. He is a superstitious man, however, so he consults his horoscope, which tells him to see the best in people today, so he also believes truly the defendant is innocent. The superstitious juror has reasons for his true belief that the defendant is innocent, but he does not believe the defendant is innocent for those reasons. Having reasons for belief is sometimes called having propositional justification—he is aware of propositions that justify his belief. Believing for reasons is sometimes called doxastic justification—his beliefs/reasons serve as the justifying basis for his belief.

The epistemic basing relation serves as the crucial distinction between propositional justification and doxastic justification. There obtains a basing relation between some subject *S*'s reasons and *S*'s beliefs if *S* has reasons that justify *S*'s belief, and *S*'s belief is based upon, or derived from, or arrived at because of, those reasons. While the superstitious juror has reasons to believe the defendant is innocent, his belief the defendant is innocent is not based upon those reasons, rather his belief is based upon the horoscope reading, so his belief is not doxastically justified. On the contrary, the

other juror's belief is based on the evidence she heard during the trial, so her belief is based upon her justifying reasons, so her belief is doxastically justified.

The precise nature of this basing relation is a matter of significant controversy. One controversy revolves around whether the basing relation is a causal relation or not. Most say yes (Vahid 2009a, 233; Wedgewood 2006, 661; Swain 1979, 27; Kallstrup 2019, 255; Lemke 1986, 138; Kvanvig 1985, 153; Audi 1986, 63). On this reading, *S*'s belief is properly based on *S*'s reasons if *S*'s reasons (non-deviantly) cause *S*'s belief. Given that the causal model is dominant, I will follow this crowd, so it is worth briefly dealing with one relevant objection to the causal model of the basing relation.<sup>1</sup> The causal deviance objection to the causal model shows that it is possible for *S*'s reasons to cause, without properly basing *S*'s belief. This is possible if *S*'s reasons deviantly cause *S*'s beliefs: *S* suddenly sees Silvia, causing *S* to believe he saw Silvia, causing *S* to become rattled and drop his tea which burns his leg, causing *S* to believe his leg is in pain (Plantinga 1993, 69; cp. Pollock and Cruz 1999, 36; Vahid 2009a, 238–242). In this case, *S*'s belief that he saw Silvia causes, through a circuitous route, *S* to believe his leg is in pain, but *S*'s belief that he saw Silvia does not serve as the basis for his belief his leg is in pain.

In response, nothing of consequence rides on the truth of the causal model, so if the causal model fails, the main contentions contained herein remain. Having said that, one response to the deviant causation objection that dovetails nicely with the discussion below is the quausation reply (Schlosser 2010, 299; Wedgewood, 2006, 670; Vahid 2009b, 125; Lord and Sylvan 2019, 155ff). According to this reply, it is not just that *S*'s reasons cause *S*'s beliefs, but *S*'s reasons-*qua*-reasons, or, in virtue of the reasonableness of those reasons, cause *S*'s beliefs. It is *S*'s belief that he saw Silvia, *in virtue of being rattling*, that causes *S* to believe he is in pain, so *S*'s belief is not properly based. In order to be properly based, *S*'s belief that he saw Silvia, *in virtue of a logical relation between seeing Silvia and leg pain*, would have to cause *S* to believe his leg is in pain. But *S*'s belief his leg is in pain does not logically follow from *S* believing Silvia is near, which explains why the basing fails. I shall follow this quausal interpretation of the causal account, not only because it holds promise in solving the deviance objection, but also because it performs additional work below.

<sup>1</sup> Perhaps presuming the causal theory is needlessly restrictive, as there are other models of the basing relation? For example, the doxastic model of the basing relation is a non-causal model of the basing relation, according to which *S*'s belief is based on *S*'s reasons if *S* also has a meta-belief that *S*'s reason is a good reason for *S* to have some belief (Tolliver 1982; Leite 2004). There is also a causal-doxastic model of the basing relation, which blends the causal model with the doxastic model (Korcz 2000). And, there are several other models of the basing relation besides. Nothing of consequence rides on presuming the causal model of the basing relation, so the conclusions reached below are equally viable for other models of the basing relation. In fact, my claim in Section Two that the basing relation is a psychological relation between mental states is actually more amenable to doxastic theories (and, by extension, to causal-doxastic theories) than causal theories, as the basing relation is unquestionably a psychological level meta-belief on doxastic theories, where the causal theory leaves open whether the basing is a psychological level relation or not. However, given that the causal model is dominant, I will follow this view.

## 2 The Basing Relation and Mental States

The basing relation is a relation that obtains between  $S$ 's reasons and  $S$ 's belief, such that  $S$ 's reasons justify and cause  $S$ 's belief. In this section I point out one implication of this definition that is often presumed in the literature, namely, that the basing relation is a psychological level relation between mental states. This may seem like an obvious feature—indeed, hopefully it is. But it is worth overabundantly justifying this claim, as it will do some heavy lifting below.

That the basing relation is a psychological level relation between mental states has been highlighted before:

I do think, however, that the basing relation is a psychological relation, in particular, a relation between mental states. I find it strongly counter-intuitive to suppose that a belief might be based on e.g., a brain tumor, a cup of tea, etc. ... An adequate theory should have, as an interesting consequence, that beliefs can only be based on other mental states” (Evans 2013, 2945).

... evidence is itself a mental state *or* one must be in a mental state to *have* the evidence. I intend for ‘mental state associated with evidence  $E$ ’ to pick out either  $E$  itself (if  $E$  is a mental state) or the mental state required to *have*  $E$  (if  $E$  is a fact or proposition). And the phenomenal basing thesis affirms that evidential basing obtains only if *that* mental state has phenomenal character (Moon 2019, 35).

The basing relation is best analyzed as a psychological relation holding among mental states. As such, an adequate discussion of the basing relation must give thought to ... the uniquely mental, intentional relations holding among mental states ... It would surely be ironic if conscious reflection on the quality of one's reasons ... were in and of itself incapable of contributing to the justification of a belief (Korcz 2000, 527–528).

These authors state that the basing relation is a psychological level relation between the basing mental state (i.e., reasons) and the properly based mental state (i.e., the belief).<sup>2</sup> What reason is there to think the basing relation is a psychological level relation between mental states? I outline three reasons in this Section, while a fourth emerges from the discussion in proceeding sections.

Most obviously, the basing relation holds between a *belief* and the *reason* for which the belief is held, where both of these ingredients are mental states. Beliefs are included, along with desires, percepts and emotions, as prototypical mental states, as they are possessed by subjects. Beliefs also display intentionality—if  $S$  believes that the sky is blue, then  $S$ 's belief is *about* the blue sky—where intentionality is a defining mark of mentality, which also shows that beliefs are mental states. As for reasons, they are composed of beliefs as well, since they are

<sup>2</sup> I leave open the possibility that the basing relation obtains between mental states (Turri 2009), or that the basing relation obtains between facts or propositions that mental states refer to (Wedgewood, 2006). In either case, the crucial point that the basing relation is a relation involving *mental* states, rather than *brain* states, is established.

beliefs standing in a logical relation.<sup>3</sup> Since the components of reasons are beliefs, and beliefs are mental states, *S*'s reasons are mental states.<sup>4</sup>

Justifying reasons are not solely constituted of beliefs, however. After all, beliefs can cause other beliefs without justifying those beliefs. Sonia, taught by a powerful guru that dreaming of losing one's teeth leads to the harm of a community member, has a dream of losing her teeth, which causes her to believe something bad is about to happen to a community member (Meylan 2019; cp. Turri 2011, 389; Neta 2019, 185–186). Her beliefs cause her conclusion, but her belief does not justify her conclusion, so it is not a justifying reason for her belief. This is why reasons are composed of beliefs that stand in a *logical relation*, or a justifying inferential relation, with the conclusive belief. *S* believes that Socrates is human, and humans are mortal, which are logically related to *S*'s belief that Socrates is mortal, so these logically related beliefs constitute *S*'s reason for believing that Socrates is mortal. This logical or justifying inferential relation is a psychological level (or meta-psychological proposition level) relation as well (Bondy and Carter, 2019, 129–130; Sylvan 2016, 383; Neta 2013, 388), so all the components of reasons are psychological, so reasons are psychological level mental states.

In addition, inferring or taking a belief to be true is commonly considered an action of reflection, where, according to the standard model of action, actions are agential level phenomena (Davidson 1980, 44; Melden 1964, 58): Juan's leg rising is a behavioural effect of the doctor's reflex hammer, but Juan raising his leg is his action, because Juan intended to raise his hand for reasons. So, since inferring is an action, and actions are agential processes, inferring is a psychological-level process. Inferring often occurs consciously as well (Moon 2019, 35), where consciousness is unanimously considered another definitive mark of mentality. The justifying inferential relation is also intentional—the belief that Socrates is human points to the conclusion that Socrates is mortal—where intentionality is also a defining feature of mentality (Vahid 2009a, 244–245). The result is that the components of reasons are shot through with mentality, leading to the uncontroversial result that the basing relation is a psychological level relation between mental states. As Jesper Kallestrup explains: “Epistemic basing is a relation between *S*'s belief that *p* and the reason *r* for which *S* believes *p*, where *r* is some mental state or extra-mental fact that justifies

<sup>3</sup> Granted, practical reasons are composed of logically related belief-desire pairings: *S* desires beer and believes there is beer in the fridge, which constitutes a reason for *S* to get the beer from the fridge. But theoretical reasons are composed of belief-belief pairings standing in a logical relation: *S* believes Socrates is human and that humans are mortal, which constitutes a reason for *S* to believe that Socrates is mortal. Epistemic basing concerns theoretical reasons, so the relevant sort of reasons are composed of logically related beliefs.

<sup>4</sup> It is possible to object here: surely non-doxastic states such as emotions, perceptions, sensations, memory and character dispositions can serve as proper bases of beliefs at times. As Marshall Swain expresses: “the class of states that can serve as reasons upon which a belief is based includes beliefs, perceptual states, sensation states, and (perhaps) unconscious states ... this list is ... probably not exhaustive” (Swain 1979, 30; cp. Evans 2013, 2945; Moretti and Piazza, 2019, 76; Korcz 2000, 526). I grant that beliefs may also be based on these non-doxastic mental states. However, my concern is with inferential basing among doxastic states, so I focus on reasons as logically related beliefs. It is also worth noting that these non-doxastic states are mental states as well, so the conclusion that reasons are mental states is still established on this expanded definition of reasons.

the belief by providing justificatory support for  $p$ " (Kallestrup 2019, 252; cp. Bondy and Carter, 2019, 129–130; Audi 1986, 31–32; Sylvan 2016, 383).

Not only is the basing relation *prima facie* a psychological level relation between mental states, but several important aspects of the basing relation also suggest this result. First, the reasons that beliefs are based on are typically considered to be epistemically accessible to the subject (Moretti and Piazza 2019, 74; Moser 1989, 141–142; Alston 1988, 276). This follows from the fact that the process whereby reasons base beliefs is an act of inference or reflection where  $S$  knowingly processes the reasons for  $S$ 's belief, which assumes that  $S$  has epistemic access to the reasons basing  $S$ 's belief. After this initial basing process is complete, subjects retain access to the reasons basing their beliefs. If a friend queries  $S$  on his reason for belief, or if  $S$  queries himself about his reason for belief,  $S$  can retrieve his reason for belief. This also assumes that reasons for belief are epistemically accessible to the subject. But the things that subjects have epistemic access to are their own mental states, so the basing relation is a psychological level relation between mental states.<sup>5</sup>

One reason why  $S$ 's reasons are epistemically accessible is because reasons are also revisable via deliberation as well. Sonia's reason for believing that someone in the community will be harmed is that she believes her dream of losing teeth foretells danger. Sonia can, indeed ought to, revise her reasons for believing her community will be harmed. Indeed, reasoning is sometimes defined as a process whereby belief revision occurs (i.e., making up our own minds), either via forming, strengthening, modifying, or abandoning reasons for belief (McHugh and Way 2018, 167; Boghossian 2018, 55; Meylan 2019). Advocates of the dispositional theory of the basing relation, for example, take beliefs to be based on reasons just if the subject revises their beliefs once their reasons are altered, which assumes that reasons are alterable in the first place (Evans 2013, 2952–2955). The ability for  $S$  to revise his reasons, however, presumes that  $S$ 's reasons are epistemically accessible to  $S$  in the first place, which assumes that  $S$ 's reasons are his own mental states.

Some take this revisability element a step further, by adding that we are responsible for the beliefs we hold, and we are only responsible for things we can control, so we must be able to control via revision our beliefs (cp. Korcz 2000, 527–528; McHugh 2013). Finn harbors racist beliefs because he thinks some races are genetically disposed to be less intelligent. He is held responsible, both morally and epistemically, for these beliefs. Responsibility, however, typically requires that we have some control over the things we are responsible for—Wade is not responsible for the fact that he did not help a choking inmate because he was locked in his own cell at the time, unable to help. In order to have control over our beliefs we

<sup>5</sup> Support for the epistemic accessibility of the basing relation is gained from, but does not rely upon, access internalist models of justification. It is possible to object to the accessibility condition on basing by pointing to unconscious, hence epistemically inaccessible, reasons that sometimes serve to base beliefs as well (Evans 2013, 2946–2947; Vahid 2009a, 232; Korcz, 1997, 172). To borrow an example from Alvin Goldman, Sally reads about the health benefits of broccoli in the *New York Times*, and forms the belief that broccoli is healthy. Two years later she still believes that broccoli is healthy, but she cannot recall where she got her information from (Goldman 1999, 281). I grant that unconscious reasons sometimes base beliefs, but unconscious reasons are theoretically accessible to consciousness. That is,  $S$  has in the past consciously deliberated from those reasons to the belief, or  $S$  can become aware of the unconscious reasons through deliberation or conversation.

must be able to revise our beliefs. And, as discussed above, in order for Finn to be able to revise his reasons for belief, these reasons must be accessible to Finn as his own mental states in the first place. Evans summarizes: “Basing is about how one is disposed to revise, and revision is a mental process ... the dispositional theory reveals why basing is mental rather than merely stipulating this” (Evans 2013, 2954).

### 3 Bad Basing

The basing relation is a psychological level relation that holds between mental states, namely  $S$ 's justifying reasons that cause  $S$ 's belief. The remainder of the paper is devoted to demonstrating the inverse, that the basing relation does not obtain between  $S$ 's belief and brain states in  $S$ 's brain. I begin some distance off, describing the architecture of scenarios where basing fails in the next two sections, so as to ultimately demonstrate how basing beliefs on brain processes fails for similar reasons in Section Five.

First a little terminology. Call it *proper* basing when  $S$ 's belief is well based, or correctly based, which happens when  $S$ 's reasons successfully serve to cause and to justify, in virtue of the reasonableness of the reasons,  $S$ 's belief.<sup>6</sup> As Jesper Kallestrup summarizes this case: “The orthodox view of epistemic basing is that agent  $S$ 's belief that  $p$  is justified when  $S$  has a reason  $r$  (or evidence  $e$ ) to believe  $p$  and  $S$  believes  $p$  on the basis of  $r$  (or  $e$ ). In that case,  $S$ 's belief is properly based” (Kallestrup 2019, 251). The juror who believes the defendant is innocent because of the evidence she heard is a case of proper basing. Call it *bad* basing when  $S$ 's belief is poorly based, or incorrectly based, which happens when  $S$ 's justifying reasons do not cause, in virtue of the reasonableness of the reasons,  $S$ 's belief (cp. Silva 2015, 376–377; Pollock and Cruz 1999, 35; Kvanvig 2003, 43–44). Any belief that is caused by some source other than a justifying reason will be badly based. The superstitious juror, who had reasons to believe that the defendant is innocent but instead believed the defendant is innocent on the basis of his horoscope is a case of bad basing. Bad basing is a broad category, as there are numerous ways in which beliefs can be improperly based, or based on “epistemically inappropriate reason[s]” (Silva 2015, 377) or, more generally, “epistemically disreputable states” (Evans 2013, 2943).

But what constitutes bad basing? What classifies as such an epistemically disreputable state that it fails to properly base a belief? The literature is filled with examples of such disreputable states, so it is worth considering some of them to get at the essence of bad basing. First, bad basing can occur when beliefs are caused by reasons, but those reasons are not justifying reasons for belief. Gilbert Harman introduces us to Albert who has good reasons for believing he will fail an ethics course, but he does not base his belief that he will fail on those good reasons, rather he believes he will fail because he believes his instructor is biased against him due to his beliefs on existentialism (Harman 1970, 842). Ru Ye gives

<sup>6</sup> For the sake of simplicity I shall say that  $S$ 's justifying reasons cause  $S$ 's beliefs, suppressing the quausation assumption that  $S$ 's justifying reasons, *in virtue of their reasonableness*, cause  $S$ 's beliefs. At relevant junctures below, I shall re-introduce this quausation assumption.

the example of Inspector Mallet, who correctly believes the professor is guilty of murder because the discovery of the victim's handkerchief in the professor's garbage can causes Mallet to reminisce about his aunt, whom he then associates with the professor (Wedgewood, 2006, 667–668; cp. Swain 1979, 25; Korcz 2000, 542). In these cases, *S*'s belief is not caused by his justifying reasons, rather *S*'s belief is caused by other types of reasons (i.e., motivating reasons in the former case and the free association of ideas in the second case). Since *S*'s belief is caused by some source other than a justifying reason, *S*'s belief is badly based.

Bad basing can occur when beliefs are caused by mental states that are not reasons. Emotions would be one example. John Turri considers the case of Miss Not, who is a juror that heard good reasons to believe Mansour is guilty but instead believes Mansour is guilty based on the fact that he looks suspicious (Turri 2010, 312). Or, to mention another example from Ye, while there is some evidence that Barry will get an A in class, he bases his belief that he will get an A on hope (Ye 2019, 15). In these cases, *S*'s belief is not caused by his justifying reasons, rather *S*'s belief is caused by other mental states such as emotions. Since *S*'s belief is caused by some source other than a justifying reason, *S*'s belief is badly based.

Not only can emotion cause belief without properly basing belief, but so can character dispositions. Ms. Prejudice bases her belief that members of a certain race are more likely to get a disease not on her research, but on her racist sentiments, so her belief is not properly based (Lehrer 1996, 33–34). Or again: there may be good reason to believe it will be a bad day, but if we form our belief that it will be a bad day due to a pessimistic temperament, then the belief is not properly based (Kelly 2002; cp. Korcz 2000, 542). In these cases, *S*'s belief is not caused by his justifying reasons, rather *S*'s belief is caused by other mental states such as character traits. Since *S*'s belief is caused by some source other than a justifying reason, *S*'s belief is badly based.

If bad basing can occur when mental states cause without justifying beliefs, how much more easily must bad basing occur when the cause of the belief is not only not a justifying reason, but not even a mental state at all! One common example is superstitious events. Henry is exposed to compelling arguments in support of the theory of evolution, but refuses to believe. Later, Henry's tarot cards tell him the theory of evolution is true, so he believes based on the tarot card reading, which is bad basing (cp. Silva 2015, 376; Turri 2010, 312; Lehrer 1971, 311; Evans 2013, 2945). Two jurors have the same evidence that the defendant is guilty, but one of them forms his belief that the defendant is guilty on the basis of his horoscope saying he would need courage to make a negative judgment about a bad man (Kvanvig 2003, 44). Lucky circumstances are another example. A jury member has good reason to believe the defendant is guilty, but instead believes the defendant is guilty based on a coin toss (Turri 2011, 383). In these cases, *S*'s belief is caused by superstitious events or lucky circumstances rather than being caused by *S*'s justifying reasons. Since *S*'s belief is caused by some source other than a justifying reason, *S*'s belief is badly based.

It is possible to object that there are alternate explanations for the bad basing in these cases. Perhaps the bad basing is sourced in fact that superstitious and lucky events are unreliable epistemic mechanisms that often produce incorrect results (Comesana, 2006, 38; Moon 2019, 37). Indeed, superstition and luck are unreliable



epistemic mechanisms. But imagine that tarot cards and coin tosses reliably produce true beliefs—the gypsy is an expert card reader, and the cards are aligned with mystical forces in the universe—would they now be sources of proper basing? I side with those who think not (cp. Lehrer 2003, 320–322; Korcz, 1997, 174), as reliable card reading lacks the structure of a reason—there is no logical connection from the cards to the belief—so it cannot be a proper base. It is not the unreliability of the cause that makes it a bad base, but the fact that the cause is something other than a justifying reason, that makes it a bad base.

## 4 Basing Relation and Atypical Brain Processes

To briefly take stock: the basing relation is a psychological level relation holding between mental states (§ 2), namely *S*'s justifying reason that causes *S*'s belief (§ 1). Hence, bad basing occurs when *S*'s belief, though possibly justified by *S*'s reason, is nevertheless not caused by *S*'s justifying reason, but is instead caused by something other than a justifying reason, such as motivating reasons, emotions, character traits, tarot cards, horoscopes, or coin tosses (§ 3). In this section I consider cases of bad basing where *S*'s belief has a different sort of cause other than a justifying reason, namely, atypically functioning brain processes.

An atypically functioning brain process is a brain process that is atypically functioning. But what is a typically functioning brain process? By this I only mean standard neural processing—positively charged sodium ions surging into neurons via ion channels, altering the electrical voltage of resting neurons, causing them to send electrical signals down their axon, eventually releasing chemicals called neurotransmitters towards other neurons, which in turn fire as well; neurons wiring together into assemblies and firing in tandem, sending electrical signals and wave patterns cascading across the brain; the electrical signals of various neural assemblies in different brain regions interacting with, and interfering with, each other in various inhibitory or excitatory ways; *et cetera*. Atypically functioning brain processing involves this normal brain processing just mentioned, but where some unusual circumstance in the brain also plays a role in causing *S*'s belief.

What sort of unusual circumstances in the brain? Helen Longino provides the example of Sam who has reason to believe *q*, but Sam is treated with drugs, and upon awakening the treatment makes her believe *q*. Longino concludes: “we would not call this a case of inferring because Sam doesn't come to believe that *p* because he believes that the fact that *q* has anything to do with the truth of *p*” (Longino 1978, 21–2). Or again, while Holmes has reason to believe Greta is the murderer, it is a brain lesion that causes him to believe Greta is the murderer. In this case, “the evidential basing relation is not instantiated” (Moon 2019, 43; cp. Sylvan 2016, 377). Or imagine Smith, whose brain tumor causes him to have the strange belief that cats and dogs are conspiring against him, but also causes him to have the true belief that he has a brain tumor. His belief that he has a brain tumor is not properly based (Lemos 2020, 37; Evans 2013, 2948). In these cases, *S*'s belief is not caused by his justifying reasons, rather *S*'s belief is caused by atypical brain processing such as drugs, tumors,

or brain lesions. Since  $S$ 's belief is caused by some source other than a justifying reason,  $S$ 's belief is badly based.<sup>7</sup>

The most relevant example of atypical brain processes causing beliefs is the case of the rogue neuroscientist who manipulates  $S$ 's brain processing, causing him to have beliefs appropriate to their background reasons (Peacocke 1979, 137; Bishop 1981; Montmarquet 1986, 147–149; Wedgewood, 2006, 670; Audi 1986, 48–50; Pappas 1979, 57–58). To borrow an example from George Pappas,  $S$  volunteers for a psychological experiment where he is wired into a machine such that technicians conjure up beliefs in  $S$ 's mind. They normally induce arbitrary beliefs that  $S$  does not normally have, such as the belief that Bluenose will win the Preakness. For fun they once induce an exactly appropriate belief:  $S$  is trying to figure out a puzzle, and he is starting to figure out the proper place for a puzzle piece. The technicians induce the belief that the piece fits in the exact locale that  $S$  is reasoning towards, and  $S$  neatly fits the piece in. In this case:

$S$  justifiably takes himself to believe that  $h$  [i.e., that the piece fits where it does] as a (causal) result of his beliefs concerning the evidence. But  $S$  is mistaken about the latter; the technicians have caused his belief that  $h$  ... the most likely response would be that in the situation described  $S$  lacks knowledge that  $h$ . After all, one might say, there is no connection between his believing the evidence and his belief that  $h$ , so how could it be that  $S$  knows that  $h$  on the basis of the evidence he has? (Pappas, 1979, 57–58).

Why doesn't  $S$  have knowledge that this piece fits where it does? Because  $S$ 's belief is not caused by his justifying reasons, but  $S$ 's belief has some causal source other than his justifying reasons, namely, his neurologically manipulated brain states.<sup>8</sup>

Ralph Wedgewood imagines a similar case where a neuroscientist implants a device in  $S$ 's brain which occasionally produces  $S$  to have certain beliefs. For the

<sup>7</sup> It is worth reinforcing the source of the bad basing here, as some of these examples contain two possible reasons for the bad basing. In some cases the belief is not justified by reasons. For example, no reason justifies Smith's belief that cats and dogs are conspiring against him. The bad basing, however, does not occur solely in virtue of the fact that Smith's belief lacks justifying reasons. The bad basing would obtain even if Smith's belief is justified by reasons. This is evident from the example from Moon: Holmes has reason to believe that Greta is the murderer, but a brain lesion, rather than those reasons, causes him to believe that Greta is the murderer, so his belief is not properly based. The source of the bad basing is the fact that  $S$ 's belief is not caused by  $S$ 's justifying reason.

<sup>8</sup> Pappas comes to a weaker conclusion than this, preferring to say that  $S$  may have knowledge after all, since  $S$ 's belief could be overdetermined, caused by both the brain manipulation of the technicians and  $S$ 's understanding of his reasoning process about the puzzle piece (Pappas 1979, 59). Of course, if  $S$ 's belief is also caused by his reasons, then  $S$ 's belief may be properly based, since the conditions on proper basing are satisfied. But the thought experiment can be reconstructed such that the technicians also block the causal efficacy of  $S$ 's reasoning. Robert Audi considers this possibility. Audi imagines the case where  $S$  forms a belief, and  $S$ 's belief is justified by  $S$ 's reasons. However,  $S$ 's reasons cause a machine to not only produce the belief in  $S$ , but the machine also suppresses the normal causal process from  $S$ 's reasons to  $S$ 's belief  $h$ , so that  $S$ 's belief is only caused by the machine. Audi concludes: "do we have belief for a reason? I think not" (Audi 1986, 47). Why is  $S$ 's belief improperly based?  $S$ 's belief is not caused by  $S$ 's justifying reasons, so the conditions on proper basing are not satisfied. Rather  $S$ 's belief has a non-justifying-reason cause, namely,  $S$ 's machine-manipulated brain, so  $S$ 's belief suffers from bad basing.

most part the device produces transitions between unrelated mental states—the sky is blue and pineapples are sweet so spiders have legs. But by fluke the device produces a belief that is rational in light of other beliefs the device just conjured up. Wedgewood concludes: “intuitively, this would not be a case of genuine reasoning” (Wedgewood, 2006, 670). Why not? Once again, *S*’s belief is not caused by *S*’s justifying reasons, rather *S*’s belief is caused by some source other than *S*’s justifying reasons, namely, *S*’s machine-manipulated brain, so *S*’s belief is badly based.

It is worth establishing the precise reason why manipulations from neuroscientists via neuroprosthetics leads to the bad basing of *S*’s beliefs. As discussed in Section Two, the failure does not happen because there is no causal process involved. There is, after all, a causal relation from the neural cause to the belief in this case. As discussed in Section Three, the failure does not happen because there is no justifying reason for the belief. The conjured beliefs are rational in light of the other reasons the devices produce. As also discussed in Section Three, the failure does not happen because the neuroscientist’s device is unreliable at producing true beliefs. We can imagine a device that reliably produces true beliefs—an agent only and always believes ‘a device is in my brain’ when caused to think this by the device itself (Goldman 1979, 6–7). The fact that the belief is reliably produced still does not provide proper basing for the belief.

Some suggest the failure is rooted in the involvement of another agent. In considering intentional action, Christopher Peacocke imagines a case where a knowledgeable neurophysiologist produces the motor impulses needed to realize *S*’s intentions. “Is my bodily movement really intentional when my arm moves exactly as I intended it to? It is not plausible to say that it is so without qualification” (Peacocke 1979, 137). Peacocke suggests the bodily movement may not be intentional because the causal chain ran “through the intentions of another person” (Peacocke 1979, 137), namely, the neuroscientist. The problem is not, however, the fact that some other agent causes *S*’s conclusion, but that *S* himself, based on his own justifying reasons, does not cause the conclusion. This can be seen by deleting the neuroscientist from the example: when photons strike a satellite in space, radio signals from that satellite cause implants in *S*’s brain to conjure up beliefs and exactly appropriate conclusions for *S*. Are *S*’s conclusions now properly based, since no other agent is involved? No. The source of the bad basing is not that another agent steered his brain, rather the source of the bad basing is that *S*, based on his own justifying reasons, did not steer his own conclusions. Peacocke is open to this being a part of the problem: “When we say that an event is ... intentional of a person, we normally imply that the person was the originator of that event” (Peacocke 1979, 137; Montmarquet 1986, 148–149; Bishop 1989, 159).

## 5 The Basing Relation and Brain Processes

While examples of atypical brain processes failing to properly base beliefs are common in the literature, the question of whether typical brain processing can serve as the basis of beliefs is less widely circulating. In this section I consider and ultimately reject this possibility.

By typically functioning brain processing I only mean the normal neural processing occurring in normally functioning humans in common situations as described in Section Four, without any indications of unusual circumstances such as drugs, brain lesions or manipulative neuroscientists. Can normal brain processes serve as the proper base of beliefs? Before investigating the issue, it is worth getting clear on what the question is, and what the question is not. It is common for epistemologists to think that  $S$ 's justifying reasons are realized by (Wedgewood, 2006, 681–682) or structured in (Ye 2019, 19–22) brain processes, where  $S$ 's reasons still serve as the proper base for  $S$ 's beliefs, but those reasons are realized in brain processing. Since this view presumes that  $S$ 's reasons are still the proper base, this view does not face any potential problem about brain processing not being able to properly base beliefs. After all, the brain processing does not base beliefs in these cases, the justifying reason does. Similarly, some say that  $S$ 's reasons supervene upon, or are dependent upon,  $S$ 's brain processes (Vahid 2009a, 238; Kallestrup and Pritchard 2017, 202; Sosa 2003). In so far as  $S$ 's reasons still serve as the proper base of beliefs, this view does not face the possible worry that brain processes cannot properly base beliefs either (Vahid 2009b, 100). Similarly, if  $S$ 's reasons are identical with  $S$ 's brain processes, then so long as  $S$ 's reasons, in virtue of the reasonableness of those reasons, rather than  $S$ 's reasons in virtue of the physical properties of those reasons, base beliefs, this view does not face the possible problem that brain processes cannot properly base beliefs. These caveats make it clear that the question at issue is whether brain processes *themselves* can properly base beliefs, rather than those brain processes serving as grounding for the reasons that properly base beliefs? Some think it intuitive to answer this question in the negative:

Not just any kind of causal dependence will do. My belief that  $p$  is causally dependent on a certain physiological state of my brain, but the former is not based on the latter (Alston 1988, 265).

Or one may consider some of the causal ancestors of a perceptual belief, say, certain neurophysiological states of one's brain. Although the perceptual belief is clearly dependent on the pertinent neural state, it is not based on it ... moreover, such law-like connections exist not only between experiences and the beliefs they give rise to but also between these beliefs and certain neural patterns in our brain that cause them. But, surely, we are disinclined to say that those neural patterns constitute the bases of our beliefs (Vahid 2009a, 238–242).

These passages maintain that beliefs, while causally dependent upon brain processes, are not based on that brain processing. But what reason is there to reject brain processing as the proper base of beliefs?

At first glance, brain processing has one advantage assisting it in serving as a proper base of beliefs, namely, brain processes cause beliefs, meeting the causal condition on proper basing. Most of the examples of bad basing in the prior sections, however, envisaged cases where the causal condition was satisfied—the coin flip caused the belief, the tumor caused the belief—but proper basing failed because those causes were not  $S$ 's justifying reasons. The same pattern emerges here, as I shall now argue that brain processing is not a justifying reason or even a mental state, so cannot serve as a proper base of belief. There are four reasons to draw this conclusion, three of which expand upon the reasons that

basing relations are mental states discussed in Section Two, and one of which is rooted in the conclusions from the past two sections.

First, beliefs were said to be based on reasons, where reasons involve a justifying inferential or logical relation holding between beliefs, and reasons are often considered actions that are consciously deliberated and involve intentionality. Without delving into the voluminous debate on whether brain processes can have these mental properties, it is typically accepted that even if brain processes can have these mental properties, these mental properties are not identical with the physical properties of brain processes. Thus brain processes, *qua* physical, have none of these features of reasons. Consider a proto-typical brain process: the firing of neurons. Positively charged sodium ions surge into neurons via ion channels, altering the electrical voltage of resting neurons, causing them to send electrical signals down their axon, eventually releasing chemicals called neurotransmitters towards other neurons, which in turn fire as well. This rudimentary articulation suffices to show that brain processes involve electrical and chemical processes interacting on complex atoms, molecules and cells, but they do not involve inferential or logical justifying relations between a subject's beliefs that refer to propositional content and are consciously deliberated. It is well nigh a category mistake to imagine neurons acting with intentionality, or logical relations between assemblies of neurons, or the conscious deliberation of packages of sodium ions. Brain processes, as brain processes, lack all the mental, justificatory, intentional, conscious, and actional components of reasons, so are not made of the right stuff to properly base beliefs, so they do not properly base beliefs.<sup>9</sup>

The basing relation was also conceived of as a mental state because *S* has epistemic access to *S*'s reasons that base *S*'s belief. But *S* lacks the introspective ability to locate the appropriate chemicals within the axon terminals of his brain that cause his beliefs. Nor can he locate any, let alone which particular, higher-level neural assemblies in his brain that realizes his reasons for belief. To borrow an example from Kallestrup: "Fiona comes to believe that tomorrow will be a bright sunny day as a result of reading the BBC forecast. Due to a glitch in her brain this belief then accidentally causes the further belief that she need not bring an umbrella to work. The worry is that Fiona has no inkling of what directly caused her umbrella belief, let alone how the weather belief provides epistemic support for it" (Kallestrup 2019, 253; cp. Alston 1988, 276; Lemos 2020, 117). Since *S* lacks epistemic access to his

<sup>9</sup> Noticing that brain processes lack the justifying inferential components of reasons is not particularly novel. Jerry Fodor notes, "I suppose that sooner or later the physicists will complete the catalogue they've been compiling of the ultimate and irreducible properties of things. When they do, the likes of spin, charm, and charge will perhaps appear on their list. But aboutness surely won't; intentionality simply doesn't go that deep" (Fodor 1987, 97; cp. Davidson 2001, 231; Wedgewood, 2006, 678ff). Hilary Putnam goes so far as to say that "it is this same mindlessness of nature that makes the action guiding predicates ... 'is a justified belief' seem 'queer'" (Putnam 1981, 211). So strongly held is the view that justificatory reasons do not appear at the neurophysical level, some so-called *via negativa* physicalists define the physical as anything that is not mental (Campbell 1997, 224; Loewer 2001, 40; Papineau 2001, 12). On this view, in order for a brain process to be physical it would literally have to not have mental properties such as inferential or logical justifying relations between beliefs that are consciously deliberated intentional acts. Without endorsing this definition of physicalism, it is nevertheless clear that brain processes are typically conceived of as lacking the essential ingredients of reasons, and hence, since beliefs are based on reasons, beliefs are not based on brain processes (cp. Vahid 2009b, 126).

brain states, and an important ingredient in proper basing is *S*'s ability to access the basis of his beliefs, brain states do not serve as proper bases for beliefs.

There are two objections worth considering. First, if *S* is hooked up to a real-time fMRI machine, *S* can deliberate about his reasons for belief while viewing screen shots of his brain activity, thereby having epistemic access to the brain states realizing his reasons for belief. This scenario, if ever possible, limits the epistemic access that *S* has to those rare moments in which he is hooked up to a sophisticated machine. Epistemic access should be more accessible than this. William Alston comes to the same conclusion: "justifiers ... must be fairly readily available to the subject through some mode of access much quicker than lengthy research, observation, or experimentation ... to be a justifier an item must be the sort of thing that, in general, a subject can explicitly note the presence of just by sufficient reflection on his situation" (Alston 1988, 276).

It may also be possible for *S* to access his brain states by virtue of the fact that *S* has access to his reasons, and his reasons may be identical with his brain states. If this identity is true, however, it is still not the case that *S* has access to his brain states *qua* physical properties. In deliberating upon his reasons, *S* may introspect the mental properties of this event (i.e., the logical relations and the conscious experience of inferring), but *S* does not introspect the physical properties of this event (i.e., locate the co-active neural assemblies in his brain). It is already established that in order for brain processing to serve as the basis of belief, rather than the reasons supervening upon, or realized in, or identical with, the brain processing, the brain processing *qua* brain processing would have to serve as the basis of belief.<sup>10</sup>

The third reason that beliefs were based in mental states was because the base of beliefs is typically considered to be revisable: *S* is able to abandon, alter or strengthen her beliefs by modifying her reasons for belief, which presumes that *S* is able to alter her reasons for belief. Brain processing, however, is not directly alterable by the subject. Even if *S* could locate the brain processes causing her beliefs (which he can't), he could not imagine how to alter the number of calcium ions that rush into axons, or alter the timing of firing neurons, or imagine how to make neural assemblies simultaneously coactive in a manner that is conducive to strengthening or weakening belief acquisition. Since the proper bases of *S*'s beliefs are revisable by *S*, but brain processes are not revisable by *S*, brain processes do not properly base *S*'s beliefs. As Keith Korb summarizes, "basing is about how one is disposed to revise, and revision

<sup>10</sup> It is also possible to object that epistemic access is not necessary for proper basing. As discussed above, reasons for belief may be forgotten or unconsciously processed, so those reasons for belief are not epistemically accessed, but those reasons for belief remain proper bases for beliefs. This conclusion also follows an externalist view of justification and knowledge. If epistemic access is not necessary for proper basing, the concern that brain processes are inaccessible does not tell against their ability to base beliefs. I grant that unconscious reasons sometimes base beliefs, but unconscious reasons are theoretically accessible to consciousness. The theoretical accessibility of unconscious reasons that base beliefs is contrasted with the inaccessibility *tout court* of the brain states that cause beliefs. As for the externalist case, I grant that other forms of proper basing other than *S*'s justifying reasons/beliefs may be available. The scope of this paper is to focus on that narrower band of beliefs properly based on *S*'s justifying reasons.

is a mental process: something like the revision system doesn't have access to non-mental objects" (Korcz 2000, 541).<sup>11</sup>

The fourth reason to think that brain processing does not properly base *S*'s belief arises from observing the structure of bad basing in the prior two sections. Bad basing occurs when it is not *S*'s justifying reasons that cause *S*'s belief, rather *S*'s belief, though reasonable in light of his reasons, is nevertheless caused by some source other than the justifying reasons. In the first instance *S*'s belief, caused by *S*'s motivating reasons, though these reasons were not justifying reasons, was badly based. Then *S*'s belief, caused by *S*'s mental states such as emotions or character dispositions, though these mental states were not reasons, was badly based. If *S*'s belief, caused by motivating reasons and other mental states rather than justifying reasons, is badly based, how much more was *S*'s belief, caused by circumstances such as tarot cards, horoscopes or coin flips badly based, due to the fact that the belief was caused by something that was not even a mental state, let alone a reason or a justifying reason. Similarly, *S*'s belief, caused by brain altering drugs, brain tumors, brain lesions and manipulative neuroscientists, was badly based due to the fact that it was caused by something that was not even a mental state, let alone a reason or a justifying reason. By parity of reasoning, *S*'s belief, caused by brain processing such as neural firing and neural assembly interaction, is also badly based due to the same fact that it is not even a mental state, let alone a reason, let alone a justifying reason. Proper basing requires that *S*'s belief be caused by *S*'s justifying reason, and brain processing is not a justifying reason, so *S*'s belief, caused by brain processing, is not properly based.

It is once again worth establishing the precise reason why brain processing fails to properly base beliefs. The failure does not happen because there is no causal process involved, as brain processes do cause beliefs, though they are still not the proper base. The failure does not happen because there is no justifying reason for the belief. As in the case of atypical brain processing, it is likely that *S* is aware of justifying reasons for the belief. After all, since it is common to assume that *S*'s brain processes

---

<sup>11</sup> There are two objections worth considering. First, it is possible to object that we can revise our brain states via our ability to revise our reasons which are identical with brain states. The response to this concern is the same as the response given above. *S* cannot revise her brain states *qua* physical properties of those brain states, so *S*'s beliefs cannot be based on her brain states in virtue of the physical properties of those brain states. If *S* can revise the mental properties of her brain states, then her belief could of course be based on the mental properties of those brain states. But this once again leaves the basing relation as a mental level phenomenon between mental properties of reasons and beliefs rather than *S*'s belief being based on brain processes *qua* physical properties. The second objection is that we may not be able to alter our reasons for belief in the first place. If unconscious reasons can base beliefs, and we are unaware of, hence do not directly alter, those reasons for belief, then it is possible for beliefs to be properly based even if the reasons for belief are not revisable. The same reply is available as given above. Namely, unconscious reasons are theoretically accessible. After being asked why she believes that chairs are sturdy, she considers the question for a while before realizing that her belief is based on the fact that chairs are made out of hard substances such as wood and metal, and hard substances are sturdy. Jan's belief is properly based, despite the fact that Jan has never considered these justifying reasons for her belief before. The concern that we cannot alter our reasons for belief can also be reached by endorsing doxastic involuntarism. It is beyond the scope of this paper to consider the debate between the voluntarists and the involuntarists. However, one consequence of the arguments contained in this paper is that it provides support for doxastic voluntarism. Namely, that revisability is a feature of proper basing tells against the doxastic involuntarist view that revisability is not possible. If, however, doxastic involuntarism proves true, other arguments made in this paper can serve as the reason for which brain processes cannot base beliefs.

subvene, or realize,  $S$ 's reasons, it is safe to assume that  $S$ 's brain processes will be accompanied by appropriate reasons, so  $S$  will be aware of appropriate reasons for belief. The situation is akin to the position of the so-called epiphenomenalists (Gadenne 2006; Robinson 2004), who say that  $S$ 's brain states subvene  $S$ 's reasons, where  $S$ 's brain states rather than  $S$ 's reasons, cause  $S$ 's beliefs. A leading objection to this epiphenomenalist view is precisely the problem raised here, namely, that it fails to deliver justification and knowledge, since  $S$ 's justifying reasons do not cause  $S$ 's beliefs (Moore 2012; Pauen 2006). So, the issue is not that  $S$  lacks reasons for belief, but rather that  $S$ 's reasons do not cause his belief. The failure also does not happen because brain processing unreliably produces true beliefs. As evident in the epiphenomenalist case, even if  $S$ 's brain states nomologically necessitate  $S$ 's belief and reliably necessitate  $S$  to have the appropriate reasons for that belief,  $S$ 's beliefs are still not properly based, as they are not caused by those reasons. The failure of proper basing also does not happen because of the involvement of some other agent, as no other agent is interfering with  $S$ 's brain processing.

It is worth evaluating two additional possible alternative sources of the bad basing. Some locate the source of bad basing in the fact that  $S$ 's reasons may (1) *indirectly* cause, via passing through (2) an *external* source,  $S$ 's belief. Beginning with (1), recall the case where seeing Sylvia causes Mike to become nervous, which causes him to spill his tea on his leg, which causes him to believe he is in pain. The tea spill causes the belief that Mike is in pain, but is not the proper base on this belief, possibly because the causal process passes through external sources such as the tea cup. Coin tosses, tarot cards and horoscopes are also external causes of  $S$ 's belief, so perhaps it is the fact that  $S$ 's belief is caused by some source external to  $S$ 's mind that is the source of the bad basing (Korcz 2000, 540ff; Wedgewood, 2006, 665ff). In the present case, however, there is no external source, at least not external to  $S$ 's mind/brain, yet the bad basing persists. Perhaps, however, it is  $S$ 's brain that is the external source, as it is external to  $S$ 's consciously accessible mental states (Vahid 2009a, 238; Ye 2019, 18–19). But to say that  $S$ 's belief is badly based because it is caused by the brain rather than the mind is essentially to grant that  $S$ 's belief is badly based because it was not caused by  $S$ 's justifying reasons.

Perhaps, rather than the externality of the causal link, it is the indirectness of the causal link that is the root of the bad basing: seeing Silvia *indirectly* causes (via causing nervousness which causes tea dropping, which causes leg pain which causes) Mike to believe he is in pain (cp. Turri 2011, 389; Kallestrup 2019, 253ff). In the present case, however, the indirectness would travel through  $S$ 's brain:  $S$ 's reasons cause, via neural intermediaries,  $S$ 's beliefs. So long as  $S$ 's justifying reasons, in virtue of their reasonableness, cause brain processes to cause other brain processes to cause beliefs,  $S$ 's reasons still properly base  $S$ 's beliefs (Ye 2019, 17–19; Korcz 2000, 541; Turri 2011, 389). There would only be bad basing if  $S$ 's reasons do not cause  $S$ 's brain processing in the first place. Having eliminated other possible sources of bad basing, the remaining option is to grant that  $S$ 's beliefs are badly based because they are not caused by  $S$ 's justifying reasons, but rather have a causal source that is not a justifying reason, namely, brain states.

In conclusion, the basing relation is a psychological level causal relation between mental states, namely, justifying reasons causing beliefs. This fact explains the source



of numerous instances of bad basing in the literature, from emotions to tarot card readings to manipulative neuroscientists. This fact also shows that other potential sources of bad basing—from lacking reasons, to unreliability to external causation or indirect causation—are not the fundamental sources of bad basing. Rather, since *S*'s beliefs are properly based when caused by *S*'s justifying reasons, the source of bad basing is *S*'s beliefs being caused by something other than a justifying reason. Given this requirement on proper basing, if *S*'s beliefs are caused by brain processes rather than *S*'s justifying reasons, then *S*'s beliefs are not properly based. Hopefully this is not a very controversial result. However, it helps to fix the lanes for proper epistemic basing, as *S*'s beliefs may be properly based in the justifying reasons which are realized in *S*'s brain states, but *S*'s beliefs may not be properly based in *S*'s brain states themselves.

## References

- Alston W (1988) An Internalist Externalism. *Synthese* 74(3):265–283
- Audi R (1986) Belief, reason, and inference. *Philosophical Top* 14(1):27–65
- Bishop J (1981) Peacocke on Intentional Action. *Analysis* 41(2):92–98
- Bishop J (1989) “Natural Agency: an essay on the Causal Theory of Action”. Cambridge University Press, Cambridge
- Boghossian P (2018) Delimiting the boundaries of inference. *Philosophical Issues* 28(1):55–69
- Campbell K (1997) Critical notices. *Philos Phenomenol Res* 57(1):223–226
- Carter A, Bondy P (2019) “The Superstitious Lawyer’s inference.”. In: Bondy P, Adam Carter J (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge
- Comesaña J (2006) A well-founded solution to the Generality Problem. *Philos Stud* 129(1):27–47
- Davidson D (1963) Actions, reasons and causes. *J Philos* 60:685–700
- Davidson D (1980) “Agency”. *Actions and events*. Clarendon Press, Oxford
- Davidson D (2001) *Essays on actions and events*. Clarendon Press, Oxford
- Evans I (2013) The Problem of the basing relation. *Synthese* 190(14):2943–2957
- Fodor J (1987) *Psychosemantics*. MIT Press, Cambridge
- Gadonne V (2006) In defense of Qualia Epiphenomenalism. *J Conscious Stud* 13:1–2
- Goldman A (1979) “What is justified Belief”. In George Pappas (ed.), *Justification and knowledge*. D. Reidel, Boston, pp 1–25
- Goldman AI (1999) Internalism exposed. *J Philos* 96(6):271–293
- Harman G (1970) Knowledge, reasons, and causes. *J Philos* 67(21):841–855
- Kallestrup J, Pritchard D (2017) Epistemic Supervenience, Anti-Individualism and Knowledge-First Epistemology. In: Carter J, Gordon E, Jarvis B (eds) *Knowledge First: approaches in epistemology and mind*. Oxford University Press, Oxford, pp 200–222
- Kallestrup J (2019) “From Epistemic basing to Epistemic Grounding”. In: Bondy P, Adam J, Carter (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge
- Kelly T (2002) The rationality of belief and other Propositional Attitudes. *Philos Stud* 110(2):163–196
- Korcz K (1997) Recent work on the basing relation. *Am Philos Q* 34(2):171–191
- Korcz K (2000) The causal-doxastic theory of the basing relation. *Can J Philos* 30(4):525–550
- Korcz K (2019) “Inference and the basing Relation”. In: Bondy P, Adam Carter J (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge
- Kvanvig J (1985) Swain on the basing relation. *Analysis* 45(3):153
- Kvanvig J (2003) “Justification and proper Basing”. In Erik Olsson (ed.), *The epistemology of Keith Lehrer*. Kluwer Publishing Co., Dordrecht, pp 43–62
- Lehrer K (1971) How reasons give us knowledge, or the case of the Gypsy Lawyer. *J Philos* 68(10):311–313
- Lehrer K (1996) “Proper function versus systematic Coherence”. In: Jonathan L, Kvanvig (eds) *Warrant in Contemporary Epistemology*. Rowman & Littlefield, Lanham, Md, pp 27–47

- Lehrer K (2003 “Coherence, circularity and consistency: Lehrer replies.”. in Olsson Erik (ed, The epistemology of Keith Lehrer. Kluwer Academic Publishers, pp 309–356
- Leite A (2004) On justifying and being justified. *Philosophical Issues* 14(1):219–253
- Lemke L (1986) Kvanvig and Swain on the basing relation. *Analysis* 46(3):138–144
- Lemos N (2020) An introduction to the theory of knowledge: Second Edition. Cambridge University Press, Cambridge
- Loewer B (2001 “From physics to Physicalism.”. In: Gillett C, Loewer B (eds) *Physicalism and its discontents*. Cambridge University Press
- Longino H (1978) Inferring. *Philos Res Archives* 4:17–26
- Lord E, Sylvan K (2019 “Prime Time (for the basing relation””. In: Patrick Bondy, Adam J, Carter (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge
- McHugh C, Way J (2018) What is reasoning. *Mind* 127(505):167–196 (check
- McHugh C (2013) Epistemic responsibility and Doxastic Agency. *Philosophical Issues* 23(1):132–157
- Melden A (1964 “Action””. In: Gustafson D (ed) *Essays in philosophical psychology*. Doubleday, New York
- Meylan A (2019) The reasons-responsiveness account of Doxastic responsibility and the basing relation. *Erkenntnis* 84(4):877–893
- Moon A (2019 “All Evidential Basing is phenomenal Basing””. In: Bondy P, Adam J, Carter (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge
- Moore D (2012) Physical-effect epiphenomenalism and a common underlying cause. *Dialogue* 51(3):397–418
- Montmarquet J (1986) Prosthesis and Pre-Emption. *Analysis* 46(3):147–152
- Moretti L, Piazza T (2019) “The many Ways of the basing Relation””. In: Patrick Bondy, Adam J, Carter (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge
- Moser P (1989) *Knowledge and evidence*. Cambridge University Press
- Neta R (2013) What is an inference. *Philosophical Issues* 23(1):388–407
- Neta R (2019) The basing relation. *Philosophical Rev* 128(2):179–217
- Pappas G (1979 “Basing Relations””. In: George Pappas (ed, *Justification and knowledge*. D. Reidel, Boston, pp 51–63
- Papineau D (2001 “The rise of Physicalism””. In: Gillett C, Loewer B (eds) *Physicalism and its discontents*. Cambridge University Press, Cambridge, pp 3–36
- Pauen M (2006) Feeling causes. *J Conscious Stud* 13(1):129–152
- Peacocke C (1979) Deviant causal chains. *Midwest Stud Philos* 4(1):123–155
- Plantinga A (1993) *Warrant and proper function*. Oxford University Press, Oxford
- Pollock J, Cruz J (1999) *Contemporary Theories of Knowledge, 2nd Edition*. Rowman & Littlefield
- Putnam H (1981) *Reason, Truth and History*. Cambridge University Press, Cambridge
- Robinson W (2004) *Understanding phenomenal consciousness*. Cambridge University Press, Cambridge
- Schlosser M (2010) Bending it like Beckham: Movement, Control and Deviant Causal Chains. *Analysis* 70(2):299–303
- Silva P (2015) Does Doxastic Justification have a basing requirement? *Australasian J Philos* 93(2):371–387
- Sosa E (2003 “Epistemology: does it depend on independence?””. In: Olsson EJ (ed) *The epistemology of Keith Lehrer*. Kluwer Academic Publishers, Dordrecht, Boston, London, pp 23–30
- Swain M (1979 “Justification and the basis of Belief””. In: George Pappas (ed, *Justification and knowledge*. D. Reidel, Boston, pp 25–50
- Sylvan K (2016) Epistemic reasons II: basing. *Philos Compass* 11(7):377–389
- Tolliver J (1982) Basing beliefs on reasons. *Grazer Philosophische Studien* 15(1):149–161
- Turri J (2009) The ontology of epistemic reasons. *Noûs* 43(3):490–512
- Turri J (2010) “On the Relationship Between Propositional and Doxastic Justification.” *Philosophy and Phenomenological Research* 80 (2):312–326
- Turri J (2011) Believing for a reason. *Erkenntnis* 74(3):383–397
- Vahid H (2009a) Triangulation, Content and the basing relation. *Grazer Philosophische Studien* 78(1):231–250
- Vahid H (2009b) *The Epistemology of Belief*, Palgrave-Macmillan: New York
- Wedgwood R (2006) The normative force of reasoning. *Noûs* 40(4):660–686
- Ye R (2019) “A doxastic-causal theory of Epistemic Basing””. In: Bondy P, Adam J, Carter (eds) *Well-founded belief: New Essays on the Epistemic Basing Relation*. Routledge

---

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.