

Part I

The Nature of Reasoning

Reasoning as a Mental Process

Abstract

What kinds of transitions in the mind constitute inference? A powerful idea, found in Frege, is that inference from state X to state Y requires the inferrer to represent in some way that X supports Y. This chapter argues that this model of inference would be stable and motivated only if the inferring subjects met a self-awareness condition, in which they are aware or can become aware by reflection of what they are inferentially responding to and why. It argues against the model on the grounds that a large class of mental transitions meet the hallmarks of inference yet fail to meet the self-awareness condition. It argues that a better model for inference drops the self-awareness condition and allows that subjects regularly draw inferences even when they do not represent what they are inferentially responding to or why.

Keywords

intelligence, rationality, reasoning, Lewis Carroll regress, inference, premises, attention

Inference without Reckoning

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Inference is a paradigm of person-level reasoning that redounds well or badly on the subject. Inferences can be epistemically better or worse, depending on the epistemic status of the premises and the relationship between the premises and the conclusions. For example, if you infer from poorly justified beliefs, or from experiences or intuitions that fail to provide any justification (e.g., you know they are false, or have reason not to endorse them), your conclusion will be poorly justified. The hallmark of inference is that the conclusions drawn by inferrers epistemically depend on the premises from which they are drawn.

We can be more exact about the inputs and upshots of inference than is allowed by the terms “premises” and “conclusions.”

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It can be natural to use these words to label either psychological entities or propositions that are their contents. Both uses can be useful. But the inputs and upshots of inference are psychological entities, and these are the things that stand in relations of epistemic dependence of the sort characteristic of inference. If you infer a state with content Q (a Q-state) from a state with content P (a P-state), then your Q-state epistemically depends on your P-state. But if the inference is poor, then the proposition Q may not depend logically, semantically, or in any other way on the proposition P.¹ Other relations of epistemic dependence could be defined for

¹ I'm talking here and elsewhere as if psychological entities involved in inference are psychological states, rather than being either states or events. If judgments are events rather than states, this usage would suggest misleadingly that judgments are never related to inferences. I'm omitting mention of events merely for brevity.

Conclusion-states include beliefs, but other psychological states can be conclusion-states as well. Some inferences begin from suppositions, and issue in conclusions in which one merely accepts a proposition, without believing it. Here one uses inference to explore the consequences of a supposition, when it is combined with other things you accept or believe. In other cases, one might accept a proposition for practical purposes. That kind of acceptance can be either a premise-state or a conclusion-state.

propositions, but those dependence relations are not necessarily the kind that is established by inference.²

Some phenomena aptly labeled “inference” don’t redound on the subject’s rational standing at all. For instance, inferences in which the premise-states are states of early vision with no epistemic power to justify beliefs fall into this category. Here I set those phenomena aside.

What makes a mental transition redound on the subject’s rational standing in the specifically inferential way? According to a natural and forceful answer to this question, inference constitutively involves a kind of self-awareness. For instance, Paul Boghossian holds that inference is a form of person-level reasoning, which he says meets the following condition:

Self-awareness condition. “Person-level reasoning [is] mental action that a person performs, in which he is either aware, or can become aware, of why he

² For instance, [Laplace \(1814\)](#) and [Chalmers \(2012\)](#) explore relationships of knowability, in order to probe what else you could know a priori, if you knew all the propositions in a carefully defined minimal subclass.

is moving from some beliefs to others.” (Boghossian
2014, p. 16)

If inference meets the self-awareness condition, then inferers are never ignorant of the fact that they are responding to some of their psychological states, or why they are so responding.

What is inference like when it satisfies the self-awareness condition? Consider the proposal that one draws an inference by registering some information (where information can include misinformation) and reckoning that it supports the conclusion, with the result that one reaches the conclusion. On this model, the inferential route to drawing a conclusion has three components: the premise-states from which one infers, a reckoning state in which one reckons that the premise-states support the conclusion, and a “because” condition according to which one reaches a conclusion from the premise-states because one reckons that they support it. If this picture of inference had a slogan, it might be that in inference, one concludes because one reckons. The reckoning model is arguably found in Frege and discussed by many thinkers after him.³

³ Frege (1979) writes: “To make a judgment because we are cognisant of other truths as providing a justification for it is known as inferring.” As

The reckoning model of inference can specify the structure and components of inference that ensure that thinkers meet the self-awareness condition. Thanks to the reckoning state, reasoners do not infer in ignorance of what they are responding to. And thanks to the reckoning state's role in producing the inference's conclusion, the things to which reasoners respond are also reasons for which they draw their conclusions.

In principle, the reckoning model could be divorced from the self-awareness condition on person-level reasoning. But since the reckoning model is motivated by the self-awareness condition, and since it serves the self-awareness construal of person-level reasoning so well, I'll say the reckoning model is canonical when it meets the self-awareness condition.

Via the self-awareness condition, the canonical reckoning model entails that inferrers can become aware of why they are moving from some beliefs to others, if they aren't so aware already. The canonical because condition is therefore a first-person rationalization of why the conclusion is drawn—not a merely causal

[Boghossian \(2014\)](#) and others point out, Frege's formulation would restrict inference only to cases in which the judgment is justified by truths and one knows this.

condition. For example, if you infer that the streets are wet from the fact (as you see it) that it rained last night, then on the canonical reckoning model, you're aware that you believe that it rained last night, and that you take that fact to support the conclusion that the streets are wet. If asked why you believe the streets are wet, you could answer, correctly, that you believe this because it rained last night. The premise-states from which you draw your conclusion are accessible to reflection.

In the rest of this chapter, I argue that subjects can draw inferences in ignorance of the exact factors they are responding to. Inference can fail to satisfy the self-awareness condition, and therefore the canonical reckoning model is not true of all person-level reasoning. My argumentative strategy is to present putative cases of inference in which subjects fail to meet the self-awareness condition. If these situations are cases of inference, the canonical reckoning model cannot recognize them as such. If these are cases of inference that the canonical reckoning model cannot account for, a natural next question is whether the fault is with the reckoning model per se, or with the self-awareness condition that makes the model canonical. To address this question, I consider non-reckoning models that keep reckoning but divorce it from the self-awareness condition.

I will argue that non-canonical reckoning models are either poorly motivated or else they face internal instabilities. The best way to account for the broad range of cases exemplified by my examples may then be by analyzing inference without appeal to reckoning. To bring such an alternative into focus, I present an approach to inference that leaves reckoning behind, and identify the family of rational responses to which it belongs.

1. Inference without Self-awareness:

Examples

Sometimes when one categorizes what one perceives, one is not aware of which features lead one to categorize as one does. Consider the following example of categorizing a behavioral disposition.

Kindness. The person ahead of you in line at the Post Office is finding out from the clerk about the costs of sending a package. Their exchange of information is interspersed with comments about recent changes in the postal service and the most popular stamps. As you listen you are struck with the thought that the clerk is kind. You could not identify what it is about the clerk that leads you to

this thought. Nor could you identify any generalizations that link these cues to kindness. Though you don't know it, you are responding to a combination of what she says to the customer, her forthright and friendly manner, her facial expressions, her tone of voice, and the way she handles the packages.

By hypothesis, there are some features of the clerk (facial expressions, manner, etc.) such that you reach the judgment that she is kind by responding to those features. And let's assume that kindness is not represented in your perceptual experience of the clerk. If it were, the judgment would be a case of endorsing an experience, rather than an inference made in response to one's perceptual experience.⁴

In other cases, one forms a judgment in response to a set of diverse factors, without being aware of everything one is responding to. Consider this example:

⁴ Arguably believing P on the basis of an experience with content P can be an inference, since one is drawing on information one has already in a rationally evaluable way, and that's a hallmark of inference. But there isn't any need to pursue this question here.

Pepperoni. Usually you eat three slices of pizza when it comes with pepperoni. But tonight, after eating one slice, you suddenly don't want any more. Struck by your own uncharacteristic aversion, you form the belief that the pizza is yucky. Though you don't know it, you're responding to the facts that (i) the pepperoni tastes very salty to you, (ii) it looks greasy, (iii) it reminds you of someone you don't like, who you recently learned loves pepperoni, and (iv) you have suddenly felt the force of moral arguments against eating meat. If the next bites of pepperoni were less salty, the greasy appearance turned out to be glare from the lights, you learned that your nemesis now avoids pepperoni, and the moral arguments didn't move you, the conclusion of your inference would weaken, and so would your aversion. You haven't classified what you see and taste as: too greasy, too salty, reminiscent of your nemesis, or the sad product of immoral practices. Nor are you consciously thinking right now about any of these things.

By hypothesis, there are features of the pizza (greasy, salty) and of your mind (you're reminded of nemesis, you feel the force of moral argument) that you're responding to, when you conclude that the pizza is yucky.

On the canonical reckoning model, the kindness and pepperoni cases are therefore not cases of inference. This result seems implausible. Both cases meet the main diagnostic of inference: epistemic dependence. You could have better or worse reasons for the conclusion in each case, and that would make the conclusion better or worse. For instance, the fact that your nemesis likes it is a poor reason to take the pepperoni to be undesirable. It is generally irrational to avoid pepperoni because your nemesis likes it, but people often respond irrationally in just this way.⁵ Perhaps the grease, salt, and moral considerations are better.

Epistemic dependence is also plainly evident in the kindness case. More description would be needed to determine how rational or irrational the response is, but it clearly has some status along this dimension. The features responded to in the kindness case might be poor grounds for concluding that the clerk is kind (who knows what

⁵ [Tamir and Mitchell \(2012\)](#)

she is like in other circumstances? Maybe she just moves carefully by habit unrelated to considering the value the package has for the sender or recipient). Alternatively, you might have good reason to take those features to indicate kindness.

If the kindness and pepperoni cases are inferences, neither of them are conscious inferences, even though they result in conscious judgments as their conclusion-state. But this feature of them does not preclude their being inferences, because in general the process of inferring doesn't have to feel like anything. You don't necessarily have to think anything to yourself, in inner speech or otherwise. You don't have to rehearse the reasoning that brought you to the conclusion. For example, while walking along a rainy street, you might come to a puddle and think that it is too big to hop across, so you will have to go around it. You need not think to yourself that you have to walk around the puddle if you want to keep your feet dry. A child playing hide and seek might not look for her opponent on the swing set, because the swings provide no place to hide, and hiding in plain sight is an option she doesn't consider.⁶

These inferences do not involve any more cognitive sophistication than what's needed to play hide and seek, or to keep

⁶ A similar example is given by [Boghossian \(2014\)](#).

one's feet dry. Yet it is clear that the thinkers in these cases end up drawing their conclusions by responding to information they have, and that their conclusion-states epistemically depend on the information they respond to. If you underestimate your own puddle-hopping abilities because you are excessively fear-ridden, your conclusion that you have to go around is ill-founded, and it is ill-founded because it is based on an ill-founded assumption that you can't jump such long distances. This case differs psychologically from cases of inference in which one rehearses the premises or conclusion to oneself or someone else. But it issues in the same relationship of epistemic dependence of a conclusion-state on other psychological states.

The only way for the reckoning model to respect the verdict that the kindness and pepperoni transitions are inferences is to adjust the reckoning state and its role in inference so that neither of them (alone or together) entails the self-awareness condition. Can the reckoning model be reinterpreted to account for them?

2. How to Lack Self-awareness in Inferring Q from P

To see what non-canonical reckoning might look like, let us zero in more closely on the kinds of self-ignorance it would have to respect.

To analyze these kinds of self-ignorance, it is useful to have labels for the features to which the inferrer responds. So let's unpack the premise-states in each case further, starting with the kindness case.

Let's say that Q = the proposition that the clerk is kind, and F is the cluster of features F_1, F_2, F_3 , that you respond to in concluding Q . Registering F and attributing it to the clerk amount to believing the premise *the clerk has F* . Being aware that you registered F and attributed it to the clerk is therefore a form of premise-state awareness.

For the sake of argument, let's assume that when you register features F , F = a cluster of features the clerk actually has. (In a more complex example, your representation of the features could be falsidical, rather than veridical.)

We can then distinguish two main ways to fail to meet the self-awareness condition: premise-state unawareness and response-unawareness. The subject in the kindness case is response-unaware just in case she is unaware (and unable to become aware by reflection) that she concluded Q because she responded to F . And she is premise-state unaware just in case she is unaware (and unable to become aware by reflection) that she registers F and attributes it to the relevant thing(s). As I've defined these two forms of self-ignorance, premise-state unawareness entails response-

unawareness. If one is unaware that one is in premise-state X, then one is unaware that one has responded to X.⁷

The kindness and pepperoni cases underdescribe the exact configurations of unawareness. There are several such configurations, but I'll focus mainly on two of them.

In the first configuration, premise-state awareness combines with response-unawareness. For example, you are aware that you register the clerk's kind manner, but unaware that you are concluding that she's kind because of her manner. Schematically: you are aware that you registered F and attributed those features to the clerk, but unaware that you responded to F in concluding Q. This configuration also characterizes a natural version of the pepperoni case in which one is aware that one has noticed that conditions (i) and (ii) hold, but unaware that one is responding to the features described in those conditions (saltiness and greasiness).

In the second configuration, premise-state unawareness combines with response-unawareness if one is both unaware that

⁷ Premise-state unawareness can also occur alongside a different form of response-awareness, in which you are aware that you have responded to something in drawing your conclusion, but unaware that it is premise-state X.

one responded to F, and unaware that one registered F at all. In the pepperoni case, an inferrer may be unaware of conditions (iii) or (iv), by being unaware that pepperoni puts her in mind of the fact that her nemesis likes pepperoni. Similarly, the inferrer might be unaware that she has felt the force of arguments against eating meat.

Assuming that the pepperoni inferrer is unaware that she's registering (iii) and (iv), she is also unaware that she's registering the conjunction of features (i)–(iv). Those features have no internal unity. They're a mere aggregate.

Analogously, if the inferrer in the kindness case registers each of the features in F taken individually, it's a further claim that she attributes the conjunction of features to the clerk. What's needed for premise-state awareness is awareness that she attributes the conjunction F to the clerk. If she doesn't attribute the conjunction to the clerk, then she can't be aware that she does. And in a natural version of the case, if she does attribute it, she's unaware that she does.

Besides premise-state unawareness and response-unawareness, there is also an intermediate form of premise-unawareness, which combines conceptual premise-unawareness

with non-conceptual premise-awareness. Here, the pepperoni-refuser may register (i) and (ii)—the pizza’s being greasy and salty—without registering them *as* greasy and salty. This distinction lets us describe more exact versions of the kindness and pepperoni case. But those other versions aren’t necessary for making the case against the canonical reckoning model, so I leave them aside.⁸

3. Unawareness in the Hands of the Reckoning Model

To account for cases of inference without self-awareness, the reckoning model has to adjust two of its main components: the reckoning state, in which the inferrer reckons that P supports Q; and the becausal condition, in which the inferrer concludes that Q because she reckons that P supports Q. The reckoning state in non-canonical reckoning must allow for premise-state unawareness, and the becausal state must allow for response-unawareness.

What does the becausal condition look like when the self-awareness condition is dropped? The canonical “becausal” condition

⁸ I will also set aside another kind of self-ignorance potentially present in the cases, in which you are aware that you registered F, but unaware that you attributed F to the clerk.

entails at a minimum that the premise-states (or their contents) figure in a correct first-person rationalization of the conclusion that the inferrer could provide. **You can explain that you concluded Q because: P. And you can explain that, because you reckon that: P supports Q.**

If response-unawareness precludes any such first-person rationalization, then a different interpretation of the “because” condition is needed. The natural proposal is that the because condition is merely causal.

Merely causal “because.” The inferrer concludes that Q because she is in a reckoning state. The fact that she reckons that P supports Q causes her to conclude Q in response to P. She has available no correct first-person rationalization of why she concludes Q.

An internal instability arises when the merely causal because condition is combined with non-canonical reckoning states that I’ll call reckoning de dicto, as opposed to reckoning de re.

4. Reckoning De Dicto

It's consistent with the kindness and pepperoni cases that the inferrer might correctly sense that there are some features to which she has responded, while being unable to identify what features those are. For instance, if asked why one judged that the clerk is kind, one might say something like, "I can't quite put my finger on it, but she just seemed to act kindly." Given our assumption for the sake of argument that kindness (the property) is not presented in the experience, this type of report wouldn't be a report of perceptual experience. In the pepperoni case, one might invent some reason for which one judges that pepperoni is yucky ("It doesn't taste right"—even if it tastes the same way it always does. Here too, we can assume that the contents of experience are unaffected by the conclusion).

The reckoning model can analyze these mental states by invoking a reckoning state in which the inferrer existentially quantifies over features she responds to, and the reckoning has wide scope over this quantifier.

Reckoning de dicto. S reckons that (for some G:
having G supports Q).

In reckoning de dicto, you believe that there are some features of the person such that she has those features, and the fact that she has those features supports the conclusion that she is kind, while having no beliefs (or other forms of opinion, such as intuition or suspicion) about which features play this role.

As an analysis of what kind of reckoning might occur in the cases, this seems to respect the basic forms of response-unawareness and premise-unawareness, while still preserving a recognizable kind of reckoning. So invoking a de dicto reckoning state is a way for non-canonical reckoning to occur in inference without self-awareness.

But de dicto reckoning fits poorly with the because condition in non-canonical reckoning. In the kindness and pepperoni cases, what causes you to draw the conclusion is (by hypothesis) that you respond to the particular features—*F* in the kindness case. They therefore do not conclude *because* they reckon de dicto, in a way that fails to specify the features.

The non-canonical reckoning model predicts that if your reckoning state is de dicto, then you draw the conclusion because you reckon de dicto that some features or other support the conclusion. That prediction goes against a central feature of the cases, which is that there are specific features you're responding to

in drawing the conclusion. You are in the de dicto reckoning state because you are responding to the specific features that by hypothesis move you to the conclusion. Your reaching the conclusion is explained by that response, not by the de dicto reckoning state.

When combined with a de dicto reckoning state, then, the becauseal condition posits the de dicto reckoning state as the putative cause of drawing the conclusion. Here lies its mistake. The de dicto reckoning state is not proportional to the causal upshot of drawing the conclusion, and therefore lacks explanatory force. The explanatory weight is carried by the fact that you respond to specific features.

In a non-canonical reckoning model, then, the only admissible reckoning states seems to be states of reckoning de re.

Reckoning de re. For some F (S reckons that:
having F supports Q).

Like reckoning de dicto, reckoning de re can in principle respect the two kinds of self-ignorance we've focused on: premise-state unawareness and response-unawareness. For instance, reckoning de re could be entirely inaccessible:

Inaccessible reckoning. You are unaware and can't become aware by reflection that you reckon that: P supports Q.

On the reckoning model, reckoning must be inaccessible, when there is premise-state unawareness or response-unawareness.

Unlike reckoning de dicto, inaccessible reckoning de re fits perfectly well with the merely causal because condition. Whereas reckoning de dicto would (ceteris paribus) make available a first-person rationalization, inaccessible reckoning de re does not make available that kind of because condition. Inaccessible reckoning de re is a way to preserve the reckoning model while accounting for inference without self-awareness.

When the self-awareness condition is met, reckoning de re adds a lot. It precludes the sense that the inferrer proceeds in ignorance of what she is responding to.

It also opens up a potential problem made vivid by Lewis Carroll: the threat that the reckoning state would be forced into the role of a premise, leading to a regress. That threat arises for any kind of reckoning state, accessible or otherwise. Proponents of the

reckoning model have proposed various answers to the threat.⁹ De re reckoning, like reckoning in general, needs a solution to the regress problem.

What, if anything, does inaccessible reckoning add to the fact that you respond to features F or (i)–(iv)? It is hard to say. Given that you respond to particular features, is it necessary to posit any further structure to have an illuminating account of inference?

In the rest of this chapter, I give some reasons to think that the nature of inference may be illuminated even without positing any structure beyond what's posited by the hypothesis that inferring is a distinctive kind of response to an informational state, or to a combination of such states, that produces a conclusion. I'll call this hypothesis the response hypothesis. The distinctively inferential kind of response to information is formed when one reaches a conclusion. The reckoning model entails the response hypothesis, but the response hypothesis does not entail the reckoning model.

We can understand quite a bit about what inference is by contrasting it with neighboring mental phenomena and reflecting on

⁹ Recent examples include [Chudnoff \(2014\)](#) and Pavese (ms).

what underlies these contrasts. The remaining discussion is an exercise in illumination without analysis.

5. What Kind of Response is Inferring?

It is useful to begin by looking more closely at what kinds of response inferential responses could be. In English, "response" can denote a mental state that one comes to be in by a certain dialectical process. For instance, a response to a question can be an answer. X's response to Y's claim can be to deny it. A response to a line of reasoning can be a belief. For instance, suppose you rehearse for me your reasoning that the tree's apricots are ripe, because apricots ripen when they're pale orange, and the apricots on the tree are pale orange. In response to the part of your reasoning that follows "because," I too, like you, might form the belief that the apricots on the tree are ripe. It would be natural to say that one of my responses to this part of your reasoning is the same as your response: it's to believe that the apricots are ripe.

These observations about English suggest that when we examine inference as closely as we have to, when trying to understand its nature, we will find several different things in the same vicinity, all of which are natural to call "responses." First, there is the route by which one came to the belief, which in the apricot example is: inferring. Attempts to analyze the inference need a label

for this route. In contrast, there is the conclusion-state at the end of this route, which in the apricot example is a belief. Finally, there is the conjunction of these two things, and this conjunction is arguably what's denoted by the most natural uses of "response" in English. When we say "Y's response to X's claim that P was to deny it," we are denoting not only Y's claim that P is false, independently of what prompted it. We are also saying that Y claimed that P is false, in response to X. We are identifying a mental state in part by the type of route by which it was formed. In the apricot example, this kind of response is the belief that the apricots are ripe, together with the route by which that belief is formed.

The response hypothesis is that inferring is a distinctive way of responding to information state that produces a conclusion. If the response hypothesis is true, then the distinctively inferential response is a locus of epistemic appraisal. An adequate theory of that type of response should identify the dimensions along which inferences can be epistemically better or worse. When the conclusion of inference is a belief, these will be dimensions of justification.

In explicating the notion of a response, I'll initially talk as if inputs are evidence. But the status of inputs as evidence is not

essential to the notion of response. What's important is that the inputs are informational states of the subject.

What is it to respond to evidence that one has? Consider ordinary updating of beliefs. If you see someone in the room walk through an exit, normally you'll believe they are not in the room anymore. This is an automatic adjustment of belief in response to changing perceptions. Responses to evidence are often less automatic when it takes some effort to recall the relevant facts (how far are you from your destination? How many miles per gallon does the car get?) and to think the matter through. In both cases, responses to evidence involve some ordinary sense in which you appreciate the force of the evidence you are responding to, even if the "appreciation" takes the form of registering support rather than a representational state, such as belief or an intuition, that the evidence rationally supports the proposition you come to believe.¹⁰ It seems doubtful that the mental activity involved in responding to

¹⁰ For discussions of other forms appreciation might in principle take, see [Fumerton \(1976\)](#), [Audi \(1986, 2001\)](#), [Tucker \(2012\)](#), and [Boghossian \(2014\)](#). Since "appreciation" is factive, these examples must be construed as ones in which the evidence does in fact support what you come to believe.

evidence can be explained in terms of any other psychological notion.

The notion of a response can be brought further into focus by contrasting it with a range of different relations that a subject could stand in to psychological states, distinct from inferentially responding to them. These relations group into three kinds: failures to respond to informational states; responses to something other than informational states; and non-inferential responses to informational states.

5.1. Failures to respond: mental jogging and bypass

The first relation is the relation of failing to respond to in any way at all to an informational state.

First, suppose that after looking in three rooms for your passport, you form the belief that it isn't anywhere else in the house. The mere sequence of searching and then forming the belief does not settle what kind of response the belief is to the information you got from searching, if it is any response at all. You could form the belief spontaneously, without its being any sort of response to the information you got from looking—not even an epistemically poor response in which you jump to the conclusion that your passport is lost.

Two subjects could move from the same mental states to the same conclusions, where only one of them is inferring the conclusion from the initial mental states. The other one's mind is simply moving from one set of states to another. Adapting an irresistible term from John Broome, we could call a transition from informational state A to informational state B "mental jogging" when state B is not any kind of response to state A.¹¹ What's the difference between mental jogging and inferring? A natural suggestion is that whereas there is no response in mental jogging, there is in inference. If you drew an inference from the information you got while looking for your passport, perhaps together with some background assumptions, you were responding to the information and assumptions.

¹¹ [Broome \(2013\)](#) uses "mental jogging" to denote a more limited phenomenon, which is a foil for reasoning as he construes it. Broome writes: "Active reasoning is a particular sort of process by which conscious premise-attitudes cause you to acquire a conclusion-attitude. The process is that you operate on the contents of your premise-attitudes following a rule, to construct the conclusion, which is the content of a new attitude of yours that you acquire in the process. Briefly: reasoning is a rule-governed operation on the contents of your conscious attitudes" (p. 234). By contrast, for Broome, mental jogging is an inference-like transition in which you reach the conclusion from them without following a rule.

In the case where information is evidence that a subject has, she could *bypass* that evidence, instead of drawing inferences from it. You could have some evidence that the café is closed on Mondays (for instance, by knowing that it is closed on Mondays), and yet nonetheless plan to have lunch at that café on Monday, failing to take into account your knowledge that the café will be closed then. You are not discounting that evidence, because you are not even responding to it at all in believing that you will have lunch at that café on Monday.

Another example of bypassing evidence comes from a kind of change-blindness in which you fixate on an object that changes size, yet you fail to adjust your beliefs in response to the information about the size change that we may presume you have taken in, given your fixation on the object. This phenomenon is illustrated by an experiment that uses a virtual reality paradigm.¹² In the experiment, your task is to select the tall yellow blocks from a series of blocks that come down a belt, and move them off to one side. Short yellow blocks and blocks of other colors should stay on the belt. In the experiment, after you have picked up a tall yellow block but before you have put it in its place, the block shrinks (hence the

¹² [Triesch et al. \(2003\)](#)).

virtual reality set-up). But many subjects keep on with their routine of putting the shortened block where it doesn't belong—in the place designated for tall yellow blocks. They are fixating on the block, and for the sake of illustrating bypass, we can presume they are experiencing the block as short. But they are not discounting this information when they maintain their belief that the block belongs with the other tall yellow ones. They are not even responding to this information. Their belief that the block is (still) tall and yellow bypasses evidence that it is short.

Bypass is a special case of mental jogging, as these relations have been defined. The concept of bypassing evidence is useful, since it highlights a form of mental jogging that is epistemically detrimental.

So far, I've contrasted inferring with mental jogging from one informational state to the next, and in particular with bypassing the information in an informational state. The difference between inferring and these relationships is well captured by the idea that the subject is responding to information in inference, but is not responding to it in any way in the other cases.

The next two relations highlight the differences between what one responds to in inference, and what one responds to in other

cases: processes fueled by rhythm and rhyme, and association between concepts.

5.2. Responses to non-informational states: rhythm and rhyme, and association

The second two relations are non-inferential responses to non-informational states. Suppose you say to yourself silently that sixteen people fit in the room. If you went on to hear yourself think that there are sixteen days till the next full moon, you might end up making this transition because these sentences (half-)rhyme and follow a rhythm (“Sixteen people fit in this room. Sixteen days till the next full moon”). In the guise of inner speech, the second thought would be a response to the rhythm and sound of the first innerly spoken thought. By contrast, inferring is not a response to rhythm and rhyme. It is indifferent to rhythm and rhyme.

Responding to information differs from responding to concepts. In associative transitions, one responds to the concepts in the informational state, rather than to any truth-evaluable portion of the state’s content. For instance, suppose that observing at dusk that the sky is growing dark, you recall that you need to buy lightbulbs. This transition from observation to memory is fueled, let’s suppose, by the fact that you associate the concepts “darkness”

and "light." Here, truth-evaluable states of observation and memory are linked merely by association. But we can distinguish these relations of the associative movement from the things to which one is responding. One is responding to the concept of darkness, not to the truth-evaluable observation of darkness in which it figures.

Abstracting from the example, the transition from a thought involving a concept X (X-thoughts) to thoughts involving Y (Y-thoughts) puts no constraints on which thoughts these are. Whenever one thinks a thought involving the concept "salt"—such as that the chips are salty, or that the soup needs more salt, or that salt on the roads prevents skidding—one is disposed to think a thought—any thought—involving the concept "pepper."

Associations leave entirely open what standing attitudes the subject has toward the things denoted by the concepts, such as salt and pepper. A subject may have zero further opinions about salt and pepper. The concepts may be no more related in their mind than the words "tic," "tac," and "toe." Which thoughts are triggered is constrained only by the linked concepts, not by any attributions a subject makes using the concept, such as attributing saltiness to the soup. In contrast, in inference, one responds to information that admits of predicative structuring.

5.3. Non-inferential responses: narrative and attention

The third pair of relations are non-inferential responses. For instance, thinking that it is dark outside might make you imagine that you could turn on the sky by switching on a giant lightbulb. The image of tugging a chain to turn on the sky, in turn, makes you remember turning on your lamp, and finding that the bulb was burned out. You then recall that you need to buy lightbulbs. The transition in your mind from the dark-outside thought to the need-lightbulbs thought exploits what one knows about lightbulbs, darkness, and light.¹³ Rather than being an

¹³ [Boghossian](#)'s depressive ([2014](#)), who is supposed to illustrate a transition that isn't inference, has a wandering mind that creates a narrative depicting himself as isolated from those people in the world who are having fun, and resonant with suffering people. Upon thinking that he is having fun, the depressive goes on to think that there is much suffering in the world. The case is not described fully enough to identify what kinds of transitions the depressive is making, but on many natural elaborations, these transitions would include inferences made in response to aspects of his outlook, such as concluding that there is much suffering in the world from something like "the fact that I'm having fun is an anomaly." He may already believe the conclusion but arrive at it freshly from this thought.

inferential response, it is a response to narrative possibilities generated by the states that one is in.

The example makes evident that you need not be drawing a poor inference from "It's dark outside" to "I need to buy lightbulbs," in order to respond to the information that it's dark outside. The norms for generating narratives differ from the norms for responding inferentially, even though one could respond in either way to the same informational state, such as a thought that it is dark outside. A single transition could be a decent development of a narrative by the standards of vivid fiction, but poor by the standards of inference.

A different relation to informational states is to direct one's attention. For instance, suppose your belief that there are pelicans nearby heightens your awareness of potential pelicans. It puts you on the lookout for pelicans. You tend to notice pelicans when they're there. When you notice them, your belief that pelicans are nearby does not affect how you interpret what you see. It simply directs your attention to places where pelicans are likely to be, without otherwise influencing which experiences you have when you attend to those places.

In this kind of case, your belief that pelicans are nearby helps explain why you form beliefs that you'd express by saying "I am

now seeing a pelican” or “There is another pelican.” This explanation, however, is mediated by your perception of pelicans. And those perceptions would normally give rise to the same beliefs, whether or not your attention had originally been directed to the pelicans by your prior belief that pelicans are nearby, and whether or not you had the prior belief that pelicans are nearby. In contrast, for you to infer that you’re seeing a pelican (or that X, which you can see, is a pelican) from the belief that pelicans are nearby, you’d have to respond to the information (or perhaps misinformation) that pelicans are nearby in a special way. This special way is neither necessary nor sufficient for the belief to direct your attention toward pelicans.

Schematically, the contrasts drawn so far are between inferring Q from P, and these other transitions from a P-state to a Q-state:

- *mentally jogging* from the P-state to the Q-state, for instance by *bypassing* the information in the P-state in forming the Q-state;
- *rhythm and rhyme*: moving from P-state to Q-state because words used to express P and Q rhyme or follow a rhythmic groove;
- *association*: moving from the P-state to the Q-state by associating a concept occurring in the P-state with a concept occurring in the Q-state;

- *constructing a narrative* from a P-state using a Q-state;
- *attention*: moving to the Q-state because the P-state directs your attention to a property that the Q-state is about.

On the face of it, what's lacking from these cases is a distinctive way of responding to the P-state that produces the Q-state. These transitions fail to be inferences, because they lack this kind of response.

5.4. Epistemic differences between poor inference and non-inference

A useful test for whether the contrasts I've drawn help illuminate the distinctively inferential response is to consider if they shed any light on the difference between poor inferences, and the various other non-inferential relations.

Recall the example of bypass involving change-blindness. Suppose you do not respond to the change in the size of the block. You persist in believing that the block is tall, when in fact, the (virtual) block has shrunk, and you have taken in this information, but have not adjusted your belief or actions. Assuming that you have evidence that it is short, your belief that the block is tall is maintained in a way that fails to take account of some highly relevant evidence.

This epistemic situation involves bypassing the information that the block is blue. Contrast bypassing that information with drawing a poor inference from it. You start out believing the block is yellow, and then, after the block changes color, you freshly infer that the block is yellow, irrationally discounting the blue appearance. Here, too, a belief is formed in a way that fails to give some highly relevant evidence its proper weight.

There's a level of abstraction at which the epistemic flaw in both cases is the same: one fails to take proper account of highly relevant evidence. The belief that P in both cases lacks propositional justification for P. Going with that difference, in both cases, the information that the block is blue defeats the belief that the block is yellow. And at the same high level of abstraction, in both cases, the subject's ultimate belief that the block is yellow (after the block changes color) is ill-founded: it is formed (in the inference case) or maintained (in the bypass case) epistemically badly.

Alongside these similarities, there is also a major epistemic difference between the bypass and inference cases. According to the response hypothesis, the response to P is the locus of epistemic appraisability in inference. It's the response to P that's epistemically bad-making. The epistemic badness is found along a further dimension that is missing in the bypass case. Its badness is not just

the negative feature of failing to be based on adequate propositional justification, or failing to take relevant evidence into account. Nor is it the generic feature of being badly based, simpliciter. Instead, the badness of the inference is located in the response. If one inferred from a blue-block experience that the block is yellow, without any assumptions that explain the disconnect between color and apparent color, that would be a poor inference.

More generally, according to the response hypothesis, the epistemically relevant features of inference reside in the distinctively inferential responses.

6. Intelligence without Reckoning

Perhaps the most principled challenge to the response hypothesis is a dilemma. Either in inference, one appreciates or registers the rational relationship between inferential inputs and conclusions (or purports to do so) in the form of a reckoning state, or else one's mind is merely caused to move from one state to another. If there is no such reckoning state, then the informational state can make a causal impact on the thinker, but cannot make a rational impact.

The picture of inference without reckoning allows a third option. It is possible to respond rationally to an information state without a reckoning state that represents what makes that response

rational. One's acknowledgment of rational support consists in the response, rather than taking the form of a state that represents the support relation.

In allowing self-ignorant inferences, inference without reckoning places them in a family of rational responses in which one cannot identify what one is responding to. This family arguably includes a range of emotional and aesthetic responses. For instance, arguably, anger or indignation can be fitting or unfitting, even when one cannot identify with any confidence what features of the situation are making one angry. One might walk away from an interaction indignant and confident that the situation merits that response, yet unable to articulate what about the situation has led one to feel that way. Similarly, the unbridled joy many people feel upon the birth of their children can intelligibly leave them wondering exactly what it is about the new configuration of life that makes them full of joy.

In the domain of aesthetic responses, on some plausible analyses, finding jokes funny has the same feature. One might never be able to pinpoint what makes something funny when it is, yet for all that, the joke might merit amusement or not.

Judgments of beauty as Kant construed them have something like this feature as well, in that even when judgments of beauty are fitting, they do not result from applying determinate concepts to the thing judged beautiful, or from following a rule that takes certain types of features of those things as inputs and delivers as the output a classification of it as beautiful. “There can be no rule according to which someone should be obliged to recognize something as beautiful.”¹⁴ And on one model of literary criticism, the task of criticism is in part precisely to articulate the features of a work that are responsible for the impact it has on its readers—both to develop those responses further and to explore which initial responses are vindicated.¹⁵

These kinds of emotional and aesthetic responses are arguably intelligent yet partly self-ignorant responses. In this respect, they are directly analogous to self-ignorant inference without reckoning. Whereas the canonical reckoning model might be seen as identifying the pinnacle of intelligent responses with self-aware inferences, inference without reckoning allows that inference can tolerate the kinds of self-ignorance described here. Whatever epistemic

¹⁴ Kant, *Critique of Judgment*, Book 1, [section 8](#).

¹⁵ For instance, [Richards \(1924\)](#). For discussion, see [North \(2017\)](#).

improvements might result from being able to pinpoint what one is responding to and why, in aesthetic, emotional, or rational domains, the initial responses one makes prior to any such attempt can still reflect the intelligence of the responder.

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