The Epistemic Role of Core Cognition

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1. Introduction

According to a traditional picture, perception and belief have starkly different epistemic roles. Beliefs have epistemic statuses as justified or unjustified, depending on how they are formed and maintained. In contrast, perceptions are "unjustified justifiers" (Bonjour 1985: 22),[1] meaning they have the power to justify certain beliefs, but cannot themselves be epistemically evaluated as justified or unjustified (e.g., Pryor 2000; Huemer 2007; Bengson 2015).[2] While this position is most frequently

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1. Bonjour introduces this term in the context of a critique of the traditional picture. Chisholm (1977: 30) uses the term 'prime mover unmoved' to describe mental states with this epistemic role.

2. The term 'unjustified' denotes lack of a positive justificatory status and so is ambiguous between having a negative justificatory status and lacking any justificatory status whatsoever. Typically, by 'unjustified' I mean having a negative justificatory status rather than lacking any justificatory status. Some authors use the term 'anti-justified' to pick out this property unambiguously (Siegel 2017). The only time I use 'unjustified' to mean lacking any justificatory status whatsoever is in the context of the phrase 'unjustified justifiers,' where I preserve this terminology because it is widely used.

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explicitly articulated by epistemic internalists, it is commonly held by externalists as well (e.g., Goldman [1979] 2012, 2008; Lyons 2016a).

Such a view of the epistemic divisions in the mind can be applied most neatly to clear cases of perception and belief. From introspection alone, we might feel satisfied with this epistemic landscape. However, psychology can often point us toward interesting and untapped areas of normative inquiry. The developmental psychology research program on core cognition has uncovered mental states that stand at the border of perception and belief, defying such neat categorization (Carey 2009; Shea 2015). Core cognitive systems are innate perceptual processors that generate basic conceptual representations, such as OBJECT and AGENT.[3] These representations function as constituents of mental states that are crucial for early reasoning and action. Core cognitive systems are fundamental in the development of mature repertoires of empirical knowledge. Because core cognition does not fit neatly into the category of either perception or belief, its epistemic role is unclear.

In this article, I consider the epistemic role of core cognition, given its unique place in cognitive architecture. Examining this borderline case of perception and belief sheds light on some of the motivations for the traditional view that perception is always an unjustified justifier, and provides some reason to question whether that view is correct.

There is a wide range of questions one could pose about the epistemic role of core cognition. I focus on the basic issue of whether the outputs of core cognition have epistemic statuses as justified or unjustified, as beliefs do, or whether they are instead outside the scope of epistemic evaluability.[4] I argue that despite core cognition's many prototypically perceptual features, the outputs of these systems do have epistemic statuses. My strategy involves a detailed examination of the psychological features of core cognition to determine which are epistemically relevant and which are not.

The rest of the article proceeds as follows: In section 2, I outline the psychological basics of the core cognitive system for representing objects. In section 3, I argue that it is a sufficient condition on a mental state's having an epistemic status that the state is based on epistemic reasons. In section 4, I argue that core object representations are based

3. I use all capital letters to denote concepts.

4. Hereafter I abbreviate 'epistemic status as justified or unjustified' as 'epistemic status'. I grant that there are other types of epistemic status that a state might have (e.g., being warranted, constituting knowledge); this is simply a terminological convenience.

on epistemic reasons, and thereby have epistemic statuses. In section 5, I discuss some objections to this view and attempt to defuse them. I conclude by discussing how focusing on this borderline case sheds light on the wider debate over the differences between the epistemic roles of perception and belief.

2. Core Object Cognition

Core cognition has been investigated in a robust research program over the last thirty years, spearheaded by Susan Carey and Elizabeth Spelke. Carey and Spelke have unearthed at least three core systems: object, agent, and number (Carey 2009).[5] Each relies on a proprietary store of information in its processing (as opposed to drawing on our general set of background beliefs), and integrates that information with sensory data. These systems are informationally encapsulated modules, operating largely independently from both beliefs stored in central cognition and from other perceptual subsystems. Carey hypothesizes that we have evolved these dedicated processing mechanisms because they help us efficiently navigate our environments and identify potential cooperative partners (Carey 2011). There is strong evidence that core cognitive systems are shared with other animals, including nonhuman primates (Hauser and Carey 1998, 2003; Uller, Hauser, and Carey 2001) and chicks (Regolin and Vallortigara 1995; Chiandetti and Vallortigara 2011).

While all of the core cognitive systems are worth investigating epistemically, I focus on the core object system, both because there is especially strong evidence that it is perception-like and in order to have sufficient space to discuss one system fully. The core object system, or "object module," takes in a set of spatiotemporal cues and relies on stored information to generate representations that are informationally richer than the spatiotemporal cues alone (Carey 2009). Evidence for the existence of a distinct object system comes from a wide array of studies on both infants and adults. Kahneman, Treisman, and Gibbs (1992), as well as Pylyshyn and Storm (1988), did much of the seminal work documenting the existence of a perceptual system that tracks midsize objects, independent of changes in many of their surface-level features. The representations this system generates are referred to as "object files" and are

5. In recent work, Spelke proposes that there are as many as six core cognitive systems, including systems for the representation of space, geometrical form, and social persons (Spelke n.d.).

generally taken to be continuous with core object cognition (Scholl and Leslie 1999; Carey and Xu 2001; Carey 2009).

A typical input to the object module is a minimally processed, early-stage visual representation that encodes a set of spatiotemporal properties. For example, the content of such a representation might be a sphere moving in a continuous arc (Gao and Scholl 2010). Because this state represents the particular type of spatiotemporal pattern it does, it is funneled into the object module instead of into other perceptual subsystems.

Within the object module, an input is classified as corresponding to an object, and the module's proprietary store of information is applied to it. This information consists of a set of constraints on objects' physical and motion properties.[6] The constraints can be formulated as a conditional with an antecedent concerning the inputs and a multipart consequent concerning the item's properties. If the typical spatiotemporal cues are present, then this item is:

- bounded
- solid
- coherent
- disposed to move along continuous trajectories
- disposed to obey the laws of contact causality
- disposed to fall when unsupported[7]

Characterizing the constraints of the object module as a conditional with a multipart consequent is appropriate because once the spatiotemporal cues are present, all of these properties are attributed to the object. We expect a ball arcing through the air to not only continue the smooth motion of that arc but also to bounce off a wall, to not spontaneously divide, and to eventually fall to the floor.

The result of the application of the constraints is an output that attributes these properties to the particular item present. The output represents that an item is an object, meaning it is bounded, solid, coher-

6. The constraints do not include information about object kinds, color, size, or geometric shape. The spatiotemporal input cues to the object module may contain some such information (e.g., size and shape), but it is not used in the module's processing.

7. There is debate over whether the support constraint is innate or whether it is incorporated into the core object system through a domain-specific learning mechanism. For evidence that the support constraint comes online after three months, see Baillargeon (1998). For further discussion, see Carey (2009).

ent, and so on (Carey 2009).[8] This representation has a rich content that goes beyond mere spatiotemporal primitives. The rich content is evinced by the kinds of inferences about objects' physical properties and future motion patterns that core object representations enable.[9]

After these properties are initially attributed to an object, their continued attributions tend to stand and fall together. For example, when an object is shown to be noncohesive, infants no longer expect it to also be continuous (Huntley-Fenner, Carey, and Solimando 2003) or to obey the laws of contact causality (Muentener and Carey 2010). These results indicate that the object module applies the properties encoded in the constraints as a unit as opposed to in a piecemeal fashion.[10] Just as seeing your cat wearing a tuxedo would make you doubt he would settle for his usual Meow Mix for dinner, seeing an object pass through a wall would make you doubt whether it would obey the laws of gravity.

The core object system is in certain ways paradigmatically perceptual and in other ways paradigmatically cognitive. It is often described as a borderline case of perception and cognition, by both psychologists and philosophers (Carey 2009; Shea 2015; Spelke n.d.). The topic of the perception/cognition border is notoriously vexed, although there has been some fruitful recent work on the topic (Burge 2010b; Quilty-Dunn 2019; Beck 2018; Block n.d.). I aim to point out features that the core object system has in common with typical instances of perception and cognition, without taking a firm stance on the nature of the border. If it turns out that core object representations do fall on one or the other side of the perception/cognition border, my epistemic arguments still

8. The use of the term 'object' here does not perfectly map onto the use of our ordinary language term 'object'. This term instead picks out the content of a particular kind of psychological state. The term 'Spelke-Object' is often used for this purpose (e.g., Casati 2004; Goldman 2006; Green 2017).

9. For a discussion of a particular experiment investigating such inferences and behavior (Stahl and Feigenson 2015), see section 3.

10. However, there is evidence that basic capacities for tracking object motion are sometimes maintained even when the solidity constraint is violated, as in the "Pulfrich Pendulum" illusion (Wilson and Robinson 1986). There is also evidence that tracking capacities are sometimes maintained in the face of noncohesion (vanMarle and Scholl 2003). This evidence indicates that the capacity to visually track objects need not always rely on the full-blown outputs of the core object system. The epistemic claims I argue for are specifically about the outputs of the core object system, and these claims are compatible with the existence of some more minimal kinds of object representations (Green 2017).

have significant and revisionary upshots (see section 5.7 for further discussion).

The perceptual nature of core object representations is intuitively apparent. When we see a ball moving through the air, we do not merely form beliefs about it. We have a visual experience of its trajectory, solidity, cohesion, and movement as a bounded whole—properties that are delivered by the core object system. The visual phenomenology of such object representations seems to be of the same kind as the phenomenology of ordinary visual experiences.

There is also experimental support for the perceptual nature of core object representations. There is much evidence that core object representations and the object files that are studied in vision science are convergent phenomena (Scholl and Leslie 1999; Carey and Xu 2001; Carey 2009). Object files are the representations of objects in adults that enable us to visually track and identify objects (Pylyshyn and Storm 1988) and are the objects of visual attention (Pylyshyn 2001). Like core object representations, object files are used for object individuation, tracking, and identification. Both core object representations and object files are produced independently of kind information, are triggered by the same types of spatiotemporal cues, and have set-size limitations of four (Carey and Xu 2001). Given that object files are uncontroversially perceptual, this convergence speaks strongly in favor of the perceptual nature of core object representations.

The core object system is also akin to perceptual systems in its modularity. Modular systems operate automatically over a limited domain of inputs and are informationally encapsulated from central cognition and other cognitive systems (Fodor 1983; Pylyshyn 1999; Firestone and Scholl 2016). Modularity is a hallmark of perceptual systems, as displayed by the persistence of visual illusions even once we discover their causes.[11] Like perceptual systems, the core object system is modular (Carey 2009). It takes in a specific type of spatiotemporal cue as inputs, and relies on a proprietary database in its processing (the constraints). Core object cognition proceeds automatically and independently from processing of other types of information (Xu and Carey 1996). Even an adult with

11. There are those who deny that perceptual systems are modular (e.g., Churchland 1988; Prinz 2006; Lupyan 2015). I do not claim here that perceptual systems are absolutely modular in the strict Fodorian sense (Fodor 1983), but I do take some degree of modularity to be a signature of perception.

sophisticated theoretical knowledge of physics has the same core object representations as an infant.

The inputs to the core object system are in some ways similar to typical perceptual inputs and in some ways similar to typical cognitive inputs. Perceptual systems take in sensory registration cues, such as patterns of light on the retina, and output states with contents such as three-dimensional surface arrangements (Burge 2010a). The core object system takes the outputs of these early perceptual systems as its inputs (Spelke n.d.). Evidence for this claim includes the core object system's ability to operate over information from multiple sensory modalities (Streri and Spelke 1988, 1989) and its sensitivity to motion relative to the three-dimensional spatial layout rather than relative to two-dimensional retinal activation (Kellman and Spelke 1983), indicating that its inputs are already significantly processed. These inputs are akin to the inputs to typical perceptual systems in that they are inaccessible to cognition and contain only data about basic physical properties. However, they are also akin to typical inputs to cognitive systems in that they have already undergone significant processing and are low-level representations rather than mere sensory registration.

Core cognitive systems are also paradigmatically cognitive in certain key respects. Core cognitive systems are widely taken to be the developmental origins of conceptual thought, due to their innate function of transforming basic input cues into representations that go beyond perceptual primitives such as shape, location, and size (Carey 2009). Furthermore, core object representations are used as premises in inferences about spatiotemporal relations between objects, such as in predicting how objects continue to move once they are out of view.[12] While the initial processing that generates object representations is modular and encapsulated from central cognition, the outputs of the object system are available for reasoning, predicting, and motivating action in central cognition.

The core object system's position at the border of perception and cognition raises the question of whether core object representations have epistemic statuses as beliefs do, or whether they are unjustified justifiers as perceptions are standardly thought to be. In the next section,

12. There is good reason to think that core object representations themselves function as premises in inferences rather than as subsequent beliefs formed on their basis, because the young infants who perform such inferences lack an independent concept of objects in central cognition.

I approach this question by considering whether core object representations are based on epistemic reasons.

3. Basing on Reasons and Epistemic Status

Underlying the traditional picture, on which beliefs have epistemic statuses while perceptions do not, is the idea that beliefs can be based on epistemic reasons while perceptions cannot. This idea can be traced back to the tight conceptual connection between the notion of justification and the notion of having good reasons. For example, consider Conee's definition of justification: "JR: Justification is a matter of having good reason—to be justified in Φ-ing is to have the relevant sort of good reason for Φ-ing" (Conee 2016).[13] Beliefs that are based on good reasons are typically taken to be justified. Beliefs that are not based on good reasons (e.g., those formed through wishful thinking) are typically taken to be unjustified.

The central issue for present purposes is under what conditions a state is apt for having an epistemic status at all, rather than under what conditions a state has a positive epistemic status as justified. However, the key conceptual connection between reasons and justification is also useful in determining aptness for epistemic status. Underlying the standard take on the different epistemic roles of perception and cognition is the idea that beliefs are apt for having epistemic statuses precisely because they are a type of state that can be based on epistemic reasons. In contrast, perceptual experiences are not considered apt for having epistemic statuses because they are not a type of state that can be based on epistemic reasons. If being based on good epistemic reasons is what makes for an epistemic status as justified, then one might think that states that are of a type that could not be based on good epistemic reasons are exempt from such evaluation. In the game of achieving optimal epistemic justification, states that cannot be based on reasons never even stand a chance at winning, so it does not make sense to criticize them for falling short. It is also natural to think that if a state *is* of a type that can be based on epistemic reasons, that makes it apt for epistemic evaluation. It is, so to

13. Conee uses 'reason' as a mass noun here, while I typically use it as a count noun to pick out a particular mental state that figures in the epistemic basing relation. Additionally, Conee discusses propositional justification, while my main focus is on doxastic justification. Nonetheless, the conceptual connection he highlights between justification and good reason carries over to the doxastic realm as well.

speak, a contender in the game. The following condition sums up this last thought:

> **Potential Reasons then Status (PRS)**: If a mental state is of a type that can be based on epistemic reasons, then that state has an epistemic status as justified or unjustified.

Determining what types a state belongs to is often a thorny matter. Furthermore, it is often difficult to ascertain which among multiple types that a state may belong to is relevant in a particular instance. To avoid these worries, I use a slightly weaker condition going forward:

> **Reasons then Status (RS)**: If a mental state is based on epistemic reasons, then that state has an epistemic status as justified or unjustified.[14]

This condition follows from **PRS** if one grants the uncontroversial (and trivially true) additional premise that states that *are* based on epistemic reasons are states that *can* be based on epistemic reasons. **RS** captures the idea that basing on reasons puts a state within the scope of epistemic evaluability as justified or unjustified. While **RS** is a sufficient condition on a mental state's having an epistemic status generally, it is particularly relevant to the question of the epistemic role of core cognition because I argue that core object representations are based on reasons. **RS** could in principle be used to consider whether other mental states, such as fears, desires, emotions, and unambiguously perceptual states, have epistemic statuses.

What is it for a state to be based on reasons? A reason is a consideration in favor of acting or representing the world in a certain way (Scanlon 2014). When a state is based on a reason, that reason is the reason for which the individual has that state (Korcz 2019; McHugh and Way 2018).[15] The reason for which an individual has a state is her motivating reason.[16] Motivating reasons are reasons that guide an agent's

14. The type of reasons referenced in the **RS** condition are particularly epistemic reasons, because being based on prudential or moral reasons may not be sufficient for a state to have an epistemic status. Corresponding versions of **RS** for the prudential and moral domains may be independently plausible, but I do not seek to defend them here. If one denies that there are distinctions between different flavors of normativity and/or reasons, one could replace 'epistemic status' with 'rational status' and 'epistemic reasons' with 'reasons' in what follows, and the gist of my arguments would be unchanged.

15. For a discussion of the possibility that the basing relation and the reason-for-which relation are not identical, see Rinard (2018).

16. Motivating reasons are also sometimes referred to as "operative reasons" (Scanlon 1998).

behavior, belief formation, and perhaps the formation of other types of mental states such as emotions or desires (Audi 2015).[17] In contrast to normative reasons, motivating reasons need not always be good reasons, although they can be. I use the standard conception of motivating reasons as mental states of an agent (Davidson 1963; Audi 2001).[18]

Epistemic reasons are roughly truth-related considerations, in contrast to moral considerations, or considerations about one's well-being.[19] Basing on epistemic reasons is a kind of response to epistemic reasons in virtue of the epistemic support those reasons provide (or are taken to provide).[20] When this response goes well, it results in the transmission of epistemic support from the basis to the based state. Beyond this basic characterization, I will not offer a full account of the basing relation here. Instead, I rely on an understanding of basing that philosophers with a variety of views on its particulars can accept. I describe my focal cases on the assumption that basing is some kind of causal relation (Armstrong 1973; Moser 1989), but if readers are committed to another account, they can substitute in the details.

17. Motivating reasons are also sometimes characterized as reasons that an agent takes to justify her beliefs or actions, or as reasons in light of which an agent believes or acts (Dancy 2000). I prefer a characterization in terms of guidance because "taking to justify" and "acting in light of" are often thought to be conscious activities, and I do not want to assume consciousness is required for a reason to motivate. If these notions are interpreted without a commitment to consciousness, such characterizations are amenable to my discussion.

18. If the reader prefers an alternative conception of motivating reasons (e.g., as propositions, or as facts), the preferred notion can be substituted throughout.

19. There are multiple ways of more precisely delineating the domain of the epistemic and the corresponding notion of an epistemic reason. One might define epistemic reasons as the kind of reasons that can aid in conferring knowledge, or as the kind of reasons that make a proposition probably true, or as the kind of reasons that play a certain technical role in epistemology. These three options are all compatible with my arguments. One other option is that epistemic reasons are reasons that make beliefs (as opposed to actions) rational. This definition is not compatible with my arguments when read as "only beliefs," because I claim that some epistemic reasons make perceptions rational. Less restrictive versions of this definition (e.g., 'reasons that make mental states rational' or 'reasons that can make at least beliefs rational') are compatible with my arguments. For further discussion of these options, see Cohen (2016a, 2016b), Conee (2016), Lyons (2016b), and McGrath (2016).

20. I sometimes use the terms 'basing on epistemic reasons' or 'epistemic basing' to abbreviate 'basing on epistemic reasons qua epistemic reasons'. I do not claim that it is sufficient for having an epistemic status that, for example, a mental state is based on a consideration that is in fact an epistemic reason but is treated solely as a pragmatic reason in the formation and maintenance of the state.

The **RS** condition invokes basing *on reasons*. On some views, there may be other basing or basing-like epistemic support relations that do not have reasons as their basis.[21] For example, the transition from perceptual experience to belief might be considered a form of epistemic basing even if perceptual experiences are not considered reasons (e.g., because they do not have a propositional format, and one holds that reasons must be propositional).[22] I leave it open whether there are such other forms of basing that do not involve reasons. What is key for the **RS** condition is that the state in question has an epistemic basis. If one prefers to reserve the term 'reason' for a more restricted class of mental states (e.g., only beliefs, or only the bases of conscious, voluntary inferences), one can substitute the term 'ground', 'justifier', or 'basis' where I use 'reason'.

In typical cases, basing on reasons results in mediate, rather than immediate, justification. Immediate justification is prima facie justification that is not even partly constituted by justification for another mental state. Mediate justification is prima facie justification that is at least partly constituted by justification for another mental state (Pryor 2000, 2013).[23] For example, when you base your belief that the coffee shop is open on your belief that the time now is after 9:00 a.m., your justification for the belief that the coffee shop is open partly rests on your justification for the belief that the time now is after 9:00 a.m.

However, basing on reasons is also compatible with immediate justification. On some views, certain special types of basing on reasons may result in immediate justification when the reasons themselves are unjustified justifiers. On some versions of both epistemic internalism and externalism, perceptual beliefs are immediately justified (e.g., Pryor

21. I thank an anonymous referee for raising this issue.

22. Other potential criteria for reason-hood that might preclude perceptual experiences from being reasons (on certain conceptions of perceptual experience) include having representational content, functioning in inferences, being entirely consciously accessible, being under voluntary control, and being dialectically offerable as justification. For arguments that experiences are in fact reasons, see Pollock and Cruz (1999) and Brewer (1999). For the related claim that experiences can be the grounds of belief, see Alston (1988). For the claim that experiences can be evidence, see Feldman and Conee (1985) and Audi (1993).

23. Pryor defines immediate justification as prima facie justification for a belief that is not constituted by justification for any another belief (Pryor 2000). In my definition, I abstract away from belief to mental states generally so as to be able to more comprehensively apply the notions of immediate and mediate justification to the cases at issue in this article, which involve core cognitive states as potential mediating sources of justification rather than only beliefs.

2000; Goldman 2006; Lyons 2009). On these views, the justification we have for perceptual beliefs is not at all due to the justification we have for any other beliefs (e.g., background beliefs about the reliability of our perceptual experiences), but is instead due to the phenomenology of perceptual experience (Pryor 2000) or to the reliability of noninferential perceptual processes (Goldman 2006; Lyons 2011). If one also holds that perceptual experiences are reasons on which perceptual beliefs are based (pace the potential concerns mentioned in the preceding paragraph), then perceptual beliefs will be based on reasons yet still immediately justified, because their bases are unjustified justifiers and thereby lack any justification that could partly constitute the justification of the based state. In section 4.2, I return to the issue of immediate justification with respect to core cognition specifically, and discuss where there is room left for immediate justification on my picture.

RS offers basing on epistemic reasons as a sufficient but not necessary condition on a mental state's having an epistemic status, leaving it open whether there are mental states that are not based on reasons but nonetheless have epistemic statuses. While the tight conceptual connection between justification and basing on reasons may make a necessary version of this condition appealing as well, I won't defend it here. One might resist the necessity of basing on epistemic reasons for a state's having an epistemic status because we often say that states are epistemically unjustified precisely because they are not based on epistemic reasons but ought to be (e.g., beliefs formed solely due to association when epistemic reasons were available, or beliefs that result from jumping to conclusions).[24] Refraining from endorsing basing on reasons as a necessary condition on a state's having an epistemic status also leaves it open whether beliefs can gain a status as justified in ways other than basing on reasons (e.g., whether innate beliefs can gain a status as justified through their evolutionary role).

Another avenue of support for **RS** comes from connections between one's reasons, one's mental states, and one's character. The epistemic statuses of an individual's mental states redound on her overall epistemic standing—for example, having an unjustified belief negatively impacts how one is doing epistemically overall. One's overall epistemic standing should reflect at least one's reasons for believing and acting

24. The necessary version of **PRS** (if a mental state has an epistemic status as justified or unjustified, then it is of a type that can be based on reasons) is not subject to this sort of counterexample and so may be more appealing than the necessary version of **RS**.

the way one does. So, when mental states reflect one's reasons, they are apt for having epistemic statuses. Being based on reasons is a paradigmatic way of reflecting reasons.

This conception of the connections between reasons, states, and character is also used in debates over moral responsibility. States formed in response to reasons are often taken to reflect a subject's moral character, rendering an individual subject to moral praise and blame for those states (Scanlon 1998; Smith 2005). While different factors (such as the kind of reactive attitudes that a state elicits) may underlie the aptness of normative assessment in the moral domain, there is a key similarity in the idea that the mental states that reflect an agent's character, either moral or epistemic, are subject to normative evaluation.

There is also a central conceptual connection between the notion of basing on epistemic reasons and the notion of inference. Like epistemic basing, inference is standardly taken to be a process that transmits epistemic support when it goes well. However, inference may require additional features that go above and beyond the requirements of basing. For example, inference may require a taking condition (Boghossian 2014) or a discursive format of the states involved (Quilty-Dunn and Mandelbaum 2018). I do not build any such requirement into my notion of basing, and so leave open the possibility of noninferential basing. Some fairly uncontroversial examples of noninferential basing are already available, such as endorsing the content of a perceptual experience (Korcz 2019). So, my argument that core object representations are based on reasons does not entail that inference occurs in the core object system.[25]

4. Basing on Reasons in the Core Object System

I use a multipronged argumentative strategy in favor of the claim that core object representations are based on reasons. I first outline the details of a particular case of processing in the core object system and explain it in terms of basing on epistemic reasons. Second, I consider some alternative explanations and argue that they are unsatisfactory. Third, I note key properties this case has in common with paradigmatic basing. The final

25. The core object system and other perceptual systems may well be inferential in the weak Helmholtzian sense, meaning merely that they involve the systematic incorporation of stored information (von Helmholtz [1867] 1910). However, they need not be inferential in the more robust sense that is typically a matter of debate among epistemologists and is often taken to require the active following of a rule (Boghossian 2014).

part of my argument comes in section 5, in the form of objections and replies, which show that no psychological feature of the core object system precludes it from involving basing on reasons.

4.1. Stahl and Feigenson (2015)

In a study by Stahl and Feigenson (2015), eleven-month-old infants were shown object motion displays that violated the constraints of the object module.[26] For example, they saw a ball that seemed to pass through a wall, violating the solidity constraint, and a truck that seemed to continue to move in a straight path off a ledge, violating the constraint that objects fall when unsupported. Upon seeing these violations, infants expressed surprise.[27] The infants were then given the opportunity to explore these objects, as well as other objects that conformed to the core cognitive constraints. The infants were more drawn to exploring objects that had violated the constraints than ones that had conformed to them. Furthermore, the infants' exploratory behavior was specifically indexed to the type of violation each object displayed. Infants banged the objects that had violated the solidity constraint (to test for solidity) and dropped the objects that had violated the support constraint (to test for whether they fall when unsupported).

Focusing on the condition in which the ball violates the solidity constraint, the key stages for understanding this case are the input, constraint, output, additional visual experience, reaction, and behavior. The input that the core object system detects is a representation of a set of spatiotemporal cues. The constraints then bring to bear the information that if something has these particular spatiotemporal properties, it is solid, bounded, coherent, and so on. The output representation has the content that this item is an object, meaning it is solid, bounded, coherent, and so on. The infant also has a visual experience of the object as nonsolid due to its apparent motion through the wall. The conflict

26. There is much evidence demonstrating the presence of the core object system in infants as young as three and four months (Kellman and Spelke 1983; Streri and Spelke 1988, 1989; Aslin and Johnson 1996). I focus on a study involving older infants because they have the ability to demonstrate behavior in response to their core object representations, which younger infants lack.

27. This surprise is detected through a looking-time methodology, which is widely used in developmental psychology. Infants look longer when they see something they do not expect. For background on this methodology as well as a defense in light of critiques, see Carey (2009).

between the core cognitive output and this visual experience generates a reaction of surprise, so the infant bangs the ball to explore this contradiction.

The key aspects of this case can be described as follows:

Input
Content: This part of the surface layout has a particular set of spatiotemporal properties.

Solidity Constraint
Content: If something has these spatiotemporal properties, it is solid.

Output
Content: This is a solid object.

Additional Visual Representation
Content: This object moves through a wall.

Reaction
Surprise.

Behavior
Bang the object.

An explanation of the infants' mental states and behavior in terms of basing on epistemic reasons says the output state is based on the epistemic reason of the input and the solidity constraint. The reason for which the infant represents the ball as a solid object is that it displays certain spatiotemporal properties, and that things with these properties are solid.

This explanation makes good sense not only of the infant's object representation but also of how it motivates her behavior. The infant also has evidence from her visual experience that this object has behaved in a nonsolid way by passing through a wall. She is motivated to confirm whether the ball really is nonsolid. She represents the ball as solid in core cognition while simultaneously experiencing it as nonsolid in her visual experience. This conflict is surprising, and so she explores to settle the matter. Appealing to the general rule contained in the solidity constraint (if something has certain spatiotemporal properties, it is solid) allows us to explain why her object representation contains the information that the object is solid, and thereby why she is justified in exploring the way she does.

In the following sections, I argue that the epistemic basing explanation is the best one, by pointing out similarities this case has with para-

digmatic instances of basing (4.2), showing why rival explanations fail (4.3), and arguing that none of core object cognition's features preclude it from involving basing on reasons (5).

4.2. Similarities with Paradigmatic Basing

In this section I discuss six similarities between the formation of core object representations and paradigmatic instances of basing on reasons: (1) epistemic support relations between contents, (2) epistemic support relations between states, (3) representational states, (4) apt contents, (5) integration in central cognition, and (6) description in epistemic vocabulary.

(1) Epistemic Support Relations between Contents
An initial reason to think this is an instance of basing on epistemic reasons is that the contents of the input and constraint epistemically support the content of the output. The information that something has a particular set of spatiotemporal properties, plus the information that if something has these properties, then it is solid, speaks strongly in favor of the conclusion that this object is solid. This mental transition has the structure of a standard modus ponens inference.

(2) Epistemic Support Relations between States
The epistemic support relation does not merely hold between contents, but also between states. The output state is formed directly in response to both the input and the constraint, as is evident from numerous studies documenting the regular causal connections in the core object system between spatiotemporal inputs and outputs that attribute solidity (e.g., Spelke et al. 1992; Hespos and Baillargeon 2001; see Carey [2009] for an overview). This rule-governed connection stands in stark contrast to merely lucky transitions between states whose contents happen to stand in relations of epistemic support. For example, consider someone who first has the beliefs that *p* and that if *p* then *q*. She then gets a bonk on the head resulting in the belief that *q*. She transitions between states whose contents stand in a relation of epistemic support, but the resultant belief state is not epistemically supported by the initial belief states. This transition occurs due to brute physical factors, not in virtue of the contents of her mental states or the entailment relations between them. Unlike this kind of lucky epistemic support relation between contents but not states, in core object cognition the output state is formed precisely because the

input and constraint epistemically support it, much in the same way we typically reach the conclusion of an inference in reasoning with beliefs.[28] This kind of transition between mental states in virtue of an epistemic support relation is central to the notion of epistemic basing.

(3) Representational States

Another point of similarity with paradigmatic basing is the representational nature of the states involved. The inputs to the core object system are genuine mental representations, as are the reasons that typically figure in epistemic basing in belief. Genuine mental representations stand in contrast to states of mere sensory registration. Retinal states, for example, are not representations and do not have content (Burge 2010a). This makes the earliest stages of sensory registration look quite distant from standard instances of basing on reasons. In contrast, states that are the outputs of early perceptual systems and have spatiotemporal properties as contents are genuine mental representations, and are thereby much more similar to inputs to reasoning in belief.

(4) Apt Contents

The representational states involved in core object cognition have the kind of contents that are apt for participating in instances of the basing relation. An easy way to see this is to imagine the infant's core object processing being replicated as an instance of reasoning in belief, with individual beliefs corresponding to the input, constraint, and output. Consider someone who, through testimony, acquires the beliefs that (1) something has a particular set of spatiotemporal properties, and that (2) things with those properties tend to be solid. She then concludes from these beliefs that the thing in question is solid. This process would be an uncontroversial instance of basing on epistemic reasons. This indicates that there is nothing about the contents of the states involved in core object cognition that precludes them from figuring in the basing relation.

(5) Integration in Central Cognition

The outputs of core cognition are integrated in central cognition in much the same way as the results of ordinary reasoning. Beliefs that are

28. This point can also be put by saying that in the bonk-on-the-head case, the subject has propositional but not doxastic justification for the belief that *q*. In contrast, in core cognition the output is doxastically justified by the input and constraint.

based on reasons typically serve as premises in further inferences and motivate behavior. While core object processing is itself modular, its outputs are accessible for reasoning and action in central cognition (Carey 2009). This is evinced by the infant's exploratory response to the contradiction between her object representation and her perception of the ball's nonsolid behavior. The object representation is freely integrated with person-level psychological states, just as beliefs based on reasons typically are.

(6) Description in Epistemic Vocabulary

The same sort of epistemic vocabulary that is used to describe reasoning with beliefs in natural language is also often applied to core cognition. Evidence for this point comes from the way core cognitive states are often described as 'knowledge', both among psychologists (Spelke 2000; Carey 2009) and in ordinary discourse. For example, when describing an infant who behaves as the subjects in Stahl and Feigenson (2015) do, we might say that she sees the ball as solid because she knows that objects tend to be solid. The 'because' here is the 'because' of basing, indicating that we think of the infant's object representation as based on the input and constraint. In contrast, it is much less natural to say that we know the rules used to transition from photoreceptor activation to early informational states in the primary visual cortex, or that those states are based on photoreceptor activation.

This linguistic evidence is defeasible, and only provides one indication of the presence of the basing relation. We might simply be wrong in our usage patterns, invoking epistemic vocabulary in situations in which it is not appropriate. Furthermore, linguistic intuitions acquired through ordinary discourse may not be fine-grained enough to distinguish between types of epistemic relations and properties. Linguistic evidence must be weighed with many other theoretical and empirical considerations. Nonetheless, the general appropriateness of using epistemic terms is one point in favor of an explanation involving basing on reasons.

Core object processing involves epistemic support relations between both contents and states, mental representations with contents that are typical of basing, and integration with central cognition, and it lends itself naturally to descriptions in epistemic vocabulary. These features are all key markers of the epistemic basing relation. The presence of these features supports the claim that core object representations are based on reasons.

The view that core object representations are based on reasons has implications for the nature of the justification these representations provide. If core object representations are based on reasons, then by **RS** they have epistemic statuses as justified or unjustified, rather than being unjustified justifiers. This in turn means that the justification we have for beliefs formed on the basis of core object representations is mediate rather than immediate justification. When the infant forms the belief that there is a solid object before her in response to her core cognitive representation of an object as solid, the justification she has for this belief is partly constituted by the justification she has for the core object representation—that is, the input and constraints of the core object system. As in a typical transition from one justified belief to another, the justification for the based state stems from the mental state(s) on which it is based. If the basis itself admits of justification (rather than being an unjustified justifier) then the based state has mediate, rather than immediate, justification.[29] I have argued that core cognitive representations are in fact candidates for justification, so despite their perception-like nature, the beliefs we form on their basis will be mediately, rather than immediately, justified.[30]

However, there is still room for immediate justification to play a role in this picture of the epistemology of perception. For one, immediate justification may reside one level lower down in the mind, in the transition from core cognitive expectations to core object representations, rather than in the transition from core object representations to beliefs. That is, core cognitive states may themselves be immediately justified,

29. It is in principle possible to have a picture on which some states have justificatory statuses but nonetheless provide justification in virtue of some other property (e.g., their phenomenology). However, this picture is unmotivated on its own and would make the states in question disanalogous with beliefs, which are the paradigm states that transmit their justificatory status to subsequent beliefs formed on their basis. For arguments against this picture as well as further discussion of immediate justification and the epistemic evaluability of perception, see Siegel (2017). Thanks to an anonymous referee for raising this issue.

30. As noted earlier (footnote 23), Pryor's original definition of immediate justification is justification that is not even partly constituted by the justification of another *belief* (rather than by the justification of another mental state). If one were to use Pryor's definition rather than my modified version, then beliefs formed on the basis of core object representations would still count as immediately justified, because their justification is due to the justification of core cognitive representations rather than that of any beliefs. However, it seems truer to the spirit of the notions of immediate and mediate justification to say that such beliefs are mediately justified rather than counting them as immediate on this technicality, because their justification is very much inherited rather than independent. My modified definition makes this point clear.

with the inputs (representations of spatiotemporal properties) and constraints (expectations about objects' solidity, cohesion, motion patterns, etc.) of the core object system acting as unjustified justifiers. I claim here that these underlying states provide justification, but I leave it open whether they do so as unjustified justifiers or as states that are themselves within the scope of epistemic evaluability. Given that the core cognitive constraints are largely innate, and so are not formed in the standard way that mental states are formed, it is especially plausible that they are unjustified justifiers.[31] If so, core object representations may themselves be immediately justified, while rendering beliefs formed on their basis mediately justified.

Furthermore, my arguments leave open whether more ordinary perceptual beliefs (ones formed in response to perceptual experiences that do not include core cognitive states) are immediately justified. While object perception is a major part of our perceptual experience, it is by no means all of it. My arguments that the epistemic basing relation occurs in core cognition are specific to that system's psychological features, so one should not generalize an elimination or radical shift in the role of immediate justification from the presence of basing in core cognition alone. A separate examination of the psychological and epistemic features of other perceptual systems is needed in order to determine the prospects for immediate justification in the rest of perception.[32]

4.3. Alternative Explanations

The infant's exploratory behavior seems prima facie intelligent, so an explanation that traces back to her reasons is a natural starting point. We want to make sense not only of the underlying physical causes of her banging the ball but also of why it seems rational for her to do so. One

31. One might instead hold that core cognitive constraints are justified in virtue of their evolutionary formation. A second possibility is that core cognitive constraints are justified in virtue of their role as start-up assumptions required to get the agent's belief formation system up and running. For a discussion of such start-up assumptions and their epistemic role, see Railton (2014). A third possibility is that while the most distinctly innate core cognitive constraints are unjustified justifiers, the aspects of core cognition that are acquired or later modulated through experience (e.g., the addition of a support constraint to the core object system at around three months [Baillargeon 1998]) are justified by the experiences that lead to these changes.

32. For application of the arguments made in this article to perceptual learning and crossmodal effects, see Jenkin (n.d.-a) and Jenkin (n.d.-b), respectively.

might wonder, though, whether any alternative analyses of the process are satisfactory. I consider three such alternatives here.

One might attempt to describe core object processing as merely a response to sensory data. Sensory receptors pick up cues about properties of the ball, and perceptual processing delivers an object representation in response to those cues. However, the sensory data taken alone does not indicate that the object is solid. The pattern of light registration on the retina is perfectly compatible with nonsolidity, so given spatiotemporal information derived from sensory data alone, the infant would not be surprised by the movement of the ball through the wall or motivated to test the ball's solidity. To account for the infant's expectations, the influence of a state that contains information about object solidity must be cited. Mental states that contain this kind of rich information and are embedded in a structure of epistemic support look very much like reasons.

One might then admit that reasons are involved in producing object representations, but appeal instead to reasons outside the object system. One might say that object representations are based on our beliefs that objects tend to be solid, rather than on the constraints of the object module. Such beliefs might be innate, or they might be commonsense or scientific beliefs learned through experience and teaching.

Given that the subjects in these experiments are infants, this account is implausible. Infants' ability to reason about the location of objects is strongly dependent on having some sort of perceptual contact with objects, indicating that their expectations about objects are housed within the core cognitive system, rather than in central cognition (Carey 2009). Unlike adults, they cannot spontaneously reason about how a hypothetical object might move. While an explanation that appeals to beliefs as reasons for object representations may have at least initial plausibility for adults, eleven-month-old infants do not display evidence of having beliefs about how objects behave. It is only via the stored information in core cognition that they expect objects to be solid.[33]

33. Furthermore, the potential nonconceptual nature of the solidity constraint and other object constraints may preclude these states from being beliefs. On a standard view, concepts are constituents of beliefs (Fodor 1975). The solidity constraint may fail to meet the generality constraint on concept-hood (Evans 1982), and it is not stored in central cognition, where concepts are typically stored and accessed, but rather embedded within a perceptual input analyzer. Infants may represent the solidity constraint within the core object system without having the concept of solidity.

The third, and perhaps most formidable, rival explanation says that the object representation is formed in response to the input and the constraint, but through a merely causal process of information transfer that is not epistemic basing. A proponent of this position might say that core cognitive processing lacks the special epistemic oomph that is present in basing and that allows for the transmission of epistemic support.

This kind of merely causal explanation is plausible for various other mental processes. Associations are the paradigm example of brute causal transitions between representations. When you hear the word 'crime' and then think PUNISHMENT, it is not because your concept CRIME provides reason for the concept PUNISHMENT, but because there is a simple causal link between the two concepts in your mind, due to their constant conjunction. The strength of some associations can also be explained by merely causal principles. For example, smells tend to evoke particularly strong emotional memories because of the neural proximity of the olfactory bulbs and the amygdala (which is the seat of emotional experience), rather than due to any particularly strong rational connection between smells and memories (Herz 2016).

Transitions from phonemic to semantic representation within the language faculty are also plausibly governed by merely causal principles rather than by epistemic support relations. The string of phonemes /h/a/t/ does not provide epistemic support for the semantic representation HAT.[34] Despite the fact that this process begins and ends with mental representations, it is structured more like a lookup table than like an inference.[35]

Some learning processes are also governed by merely causal, rather than rational, principles. For example, face recognition abilities originate with an innate predisposition to look at configurations of items that are structured like a human face (e.g., two items above and one below, resembling eyes and a mouth). This looking bias allows an infant's visual system to extract the relevant information it needs to perform detailed facial recognition (Morton and Johnson 1991). The innate face recognition capacity causally enables the development of the mature face recognition capacity by providing it with representations that contain the relevant information (in the form of statistical properties), but the initial minimal three-item representations do not function as reasons that sup-

34. I use slashes to denote separations between phonemes.
35. Thanks to Jake Quilty-Dunn for suggesting this example.

port the representation of particular faces.[36] Shea (2016) describes such cases as ones in which the formation of new representations is not explicable by the content of any preexisting representation.

While association, the phonemes to semantics transition, and the development of face recognition are each amenable to a merely causal explanation, such a story is less plausible for core cognition. A merely causal explanation fails to account for why core cognition's processing rules correspond to epistemic support relations between mental states. Unlike these other mental processes, the core object system's inputs and constraints stand in a structure of epistemic support to its outputs. A merely causal explanation also fails to explain the intelligent nature of the infant's exploratory behavior. Associations do not beg for a rational explanation, and are in fact often taken to be the paradigm of arational cognition. In contrast, we are very tempted to say that the infant in Stahl and Feigenson's experiment is justified in exploring the way she does, and to search for a deeply rationalizing explanation of her action.

The epistemic basing explanation can account for why the principles governing core cognition correspond precisely to epistemic support relations between the input, constraint, and output. It is because the transition occurs in virtue of the epistemic support relations obtaining. When the epistemic support relations are absent (e.g., when the spatiotemporal cues represented in the input do not indicate the presence of an object), a core object representation is not produced. The epistemic basing explanation can also account for the intelligent nature of the infant's behavior. Her exploration (e.g., banging the ball) is justified in virtue of how she expects objects to move and the violation of this expectation that she has just experienced. On the view on which core cognition involves epistemic basing, we can make good sense of her justification for her exploration by tracing it back to the reasons embedded in the constraints of her core object system.

5. Objections and Replies

My claim that perception-like states such as core object representations are based on reasons is at odds with traditional conceptions of the scope of epistemic evaluability. There are many objections one might have to

36. My claim here is specifically about whether the learning process from the initial looking bias to the face recognition system is driven by reasons. I leave it open whether an individual instance of face perception within the mature system is based on reasons.

this claim. Features of core cognition that might motivate such objections include:

- lack of conscious awareness of reasons
- presentational phenomenology
- innateness
- modularity
- lack of voluntary control
- implicit representations
- status as a borderline psychological kind

Some of these objections involve the role of a subject's perspective on her own reasoning processes, and have been discussed in traditional epistemology. Others arise from the particular psychological features of core cognition, and have not been much discussed elsewhere in epistemology. I argue that none of these objections is successful. My strategy in responding to these objections frequently takes the form of citing examples of basing on reasons in belief that share the controversial-seeming features of core cognition, demonstrating that such features do not preclude a process from being based on reasons. The psychological properties that may initially seem to be marks of the part of the mind beyond epistemic evaluability can actually occur in instances of basing.

5.1. Lack of Awareness

A first objection comes from the idea that awareness of one's reasons plays a crucial role in the basing relation (Moser 1989).[37] The simplest version of this view requires only awareness of one's reasons. A second version of this view requires awareness of both one's reasons and the support those reasons provide. A third version of this view also requires awareness of one's response to those reasons (more complex permutations are, of course, possible [e.g., Tolliver 1982]). A proponent of any view in this family will deny that core object representations are based on reasons, because we are not aware of the inputs or constraints of the core object

37. In a similar vein, some views of the nature of inference hold that there is a "taking condition" on inference, meaning that "inferring necessarily involves the thinker *taking* his premises to support his conclusion and drawing his conclusion *because* of that fact" (Boghossian 2014: 5). "Taking" is typically understood as requiring some form of awareness. I stick to discussion of views of the basing relation rather than inference here to leave open the possibility that inference may be a subset of basing rather than coextensive with it. For more on this point, see my discussion of inference at the end of section 3.

system, nor of the epistemic support they provide, nor of our response to these states.

However, these views of the basing relation are implausible, independent of the particular arguments about core cognition I make here. There are convincing cases of basing on reasons in belief that do not involve any of these forms of awareness of one's reasons. For example, consider cases of expertise in which knowledge is stored outside of awareness, but nonetheless informs reasoning. A seasoned pilot may have learned certain principles throughout the course of her training, such as how best to angle a plane when landing in different scenarios.[38] When she makes a routine landing, she relies unconsciously and automatically on such principles in her decisions about how to direct the plane (Dreyfus and Dreyfus 1980). She may even be unable to articulate these principles if asked. Nonetheless, it is natural to say that her belief that angling the plane thirty degrees downward is appropriate in her current situation is based on the reason that smaller angles are better for landings on longer runways. It also seems appropriate to say that this belief is justified.[39] If these natural verdicts are correct, then there can be instances of basing on reasons resulting in justified beliefs in which the subject is neither aware of her reasons, nor of the epistemic support those reasons provide, nor of her response to those reasons.

An alternative interpretation of such cases of unconscious expertise might say that they involve a nonintellectualist kind of know-how that is distinct from basing on reasons. For example, the pilot might rely on her embodied understanding of how to angle the plane across different conditions, without ever drawing on propositional knowledge.

Two points of reply are pertinent here. First, I do not take basing on reasons and implicit or embodied knowledge to be mutually exclusive. I address this issue in detail in section 5.6. Even when expertise does not involve discrete propositional states, experts' beliefs might nonetheless be based on reasons embodied in rules of their mental systems. These expert beliefs will be evaluable as justified or unjustified depending on how well know-how is governing belief formation in any particular case.

38. In some cases of expertise acquisition, knowledge is at one point conscious and then becomes unconscious. In other cases knowledge is unconscious throughout the acquisition process. I take either sort of example to be a plausible instance of basing on reasons without awareness.

39. For similar examples of basing on reasons of which one is unaware, see Kornblith (2012: 46) and Quilty-Dunn and Mandelbaum (2018: 5).

Whether we think the pilot's belief that she ought to angle the plane a certain way is based on explicit propositional representations or is a result of nonintellectualist know-how, the intuition remains that the pilot's belief is justified.

Second, while some cases of unconscious expertise may be compatible with a know-how explanation, there are other compelling cases of unconscious basing on reasons that are not. For example, consider beliefs and actions that arise out of unconscious feelings of love. In Jane Austen's *Emma*, Emma is in love with Mr. Knightley but is entirely unaware of this fact (Austen [1815] 2003). She sees herself as a matchmaker but never a pawn in the game of romance. Nevertheless, when Mr. Knightley chastises Emma for insulting her tiresome elderly neighbor Miss Bates, Emma reacts with extreme shame. She immediately resolves to visit Miss Bates and apologize. With Emma's willful and spirited personality, she would have typically shrugged off any such correction. Her unconscious love of Mr. Knightley, and her corresponding unconscious desire to appear virtuous in his eyes, serve as reasons for her belief that she should visit Miss Bates to atone. Such cases of beliefs and behavior based on reasons arising from unconscious love are common in human psychology, and they typically involve responses to particular discrete reasons rather than wholly nonintellectual skill.

Psychological evidence also supports the claim that there is basing on reasons of which we are unaware. Studies show that subjects who are presented with the first premise of a modus ponens inference schema consciously, and the second premise unconsciously, are reliably faster at recognizing the appropriate conclusion to the inference than when the second unconsciously presented premise does not support the conclusion (Reverberi et al. 2012). Subjects were consciously shown a premise of the form 'If *p*, then *q*' and then unconsciously shown either a premise of the form '*p*' (completing an instance of modus ponens) or a premise not of the form '*p*'.[40] This second premise was presented with both forward and backward masks, and was flashed for only 50 milliseconds, which is not enough time for conscious perception in this context.

40. For example, subjects were consciously presented with the premise 'If there is a 2, there is a 4', unconsciously presented with the premise 'There is a 2', and then at test shown either '4' or another numeral such as '5' or '8'. The correct conclusion of this inference is 'There is a 4'. When subjects form the belief that there is a 4, they are faster at identifying the 4 (and at subsequently evaluating it as even or odd, as Reverberi et al. also tested).

Subjects identified the conclusion '*q*' reliably faster when they had been shown a premise of the form '*p*' than when they had been shown another premise. Subjects seem to be performing an unconscious modus ponens inference.

This experiment also controlled for effects of mere associative priming by unconsciously presenting subjects with a premise of the form '*q*', after being consciously presented with the same premise of 'If *p*, then *q*'. The conclusion '*p*' was not facilitated. The conclusions '*p*' and '*q*' should both be equally associated with 'If *p*, then *q*', because both appear in the conditional with equal frequency, so associative priming cannot explain the unique facilitation for '*q*' after presentation of '*p*', and not the reverse. An inferential structure is required to explain the data. These results indicate that the unconscious premise can serve as a reason on which the conclusion is based, despite the fact that subjects are not aware of it.

Some forms of categorization may also be instances of the basing relation in which subjects are aware of neither their reasons nor the epistemic support those reasons provide.[41] In thinking that reflects 'psychological essentialism', adults and children form beliefs using the assumption that category members share a hidden essence (Medin 1989; Gelman 2003). While explicit endorsement of an essentialist metaphysics is rare (even among professional philosophers), reliance on essentialist thought patterns is common. This is particularly salient in the case of children, who typically lack explicit theories of kinds or categories. For example, seven-year-olds judge that a raccoon transformed to look and smell like a skunk is still a raccoon, despite its altered physical features (Keil 1989). Three- and four-year-olds believe that a cow raised by pigs will still moo and have a straight tail, rather than oinking and having a curly tail (Gelman and Wellman 1991). These beliefs are based on an idea of the animal's essence or 'innate potential', and the particular set of kind properties that essence engenders, independent of environmental influence. Despite lacking awareness of their own essentialist ideas (let alone the underlying genetic codes or biological structures), children use them as reasons to support category judgments and predictions.[42]

If we denied such cases were instances of basing on reasons, we would lose the ability to classify them as members of the same family as

41. Thanks to an anonymous referee for suggesting the example of categorization.

42. For a related discussion of categorization as inference without awareness, see Siegel (2017: 95–98).

conscious reasoning, despite their core intuitive and structural similarities. We might also lose the ability to epistemically critique and praise individuals for beliefs formed well or poorly in response to unconscious reasons, in a way that is in line with our common practices. Cases such as the pilot's expertise are precisely those in which we want to give the individual epistemic credit for her skilled belief-formation. Conversely, if the pilot had angled the plane slightly too sharply down despite her years of training, leading to a bumpy landing, we would say that she should have known this angle was suboptimal, and that her belief it was appropriate was unjustified. Given the extent of our psychology that operates unconsciously, any plausible account of the basing relation should not rule out that mental states can be based on reasons of which we are unaware. The presence of such instances of basing without awareness in belief shows that lack of awareness in core object processing cannot preclude core object representations from being based on reasons and having epistemic statuses.

5.2. Presentational Phenomenology

A second objection comes from the idea that perceptual states provide a kind of default justification in virtue of their presentational phenomenology that does not depend on how they are formed or maintained. This position, called *phenomenal conservatism*, puts meat on the bones of the idea that perceptions are unjustified justifiers by appealing to the phenomenology of perceptual experiences to explain why they provide justification without themselves having epistemic statuses as justified (Pryor 2000; Huemer 2007; Chudnoff 2011; Tucker 2013; Bengson 2015). A proponent of phenomenal conservatism might hold that core object representations have presentational phenomenology and so are unjustified justifiers, rather than having epistemic statuses as justified or unjustified.[43]

This objection effectively denies that a mental state's being based on epistemic reasons is sufficient for that state to have an epistemic status (the **RS** condition), by postulating that lacking presentational phenome-

43. A phenomenal conservative might in principle grant that some perceptual states have epistemic statuses as justified or unjustified, depending on how they are formed and maintained, yet nonetheless provide default justification in virtue of their phenomenology. This position would allow for a state to be itself unjustified yet still provide a default level of justification. Typically, the justificatory status of a state determines the amount of justification that state provides. Giving up this principle would significantly disrupt our framework for the transmission of epistemic justification.

nology is also a necessary condition on a state's having an epistemic status. According to phenomenal conservatism, having presentational phenomenology is sufficient for a state to be an unjustified justifier (and thereby lack an epistemic status). On this view, if core object representations have presentational phenomenology, then they do not have epistemic statuses, irrespective of whether they are based on reasons, because phenomenology alone is enough to ensure a state is an unjustified justifier.

I grant that core object representations can have presentational phenomenology of the sort that is typical of perceptual states. There is intuitively something it is like to see an object. Furthermore, core object representations bear many of the key psychological markers of perceptual states that typically have presentational phenomenology (e.g., they are formed modularly, they are the objects of visual attention).

However, presentational phenomenology does not preclude a state from having an epistemic status as justified or unjustified. While a full argument against phenomenal conservatism is beyond the scope of this article, my positive arguments for the **RS** condition in section 3, taken together with my arguments that some mental states are both based on reasons and have presentational phenomenology (such as core object representations), show that phenomenology does not decisively determine a state's epistemic role. Phenomenal conservatism gains much of its intuitive plausibility from the idea that states with presentational phenomenology are not the sorts of states that can be based on reasons, and so can never vary in the amount or source of the epistemic support they provide. I have undermined this idea and defended the **RS** condition, rendering this aspect of phenomenal conservatism implausible. Siegel (2011, 2017) has also argued against phenomenal conservatism from the idea that perceptual experience is cognitively penetrable. If Siegel is correct that perceptual experiences whose etiologies mirror structures of irrational belief formation are irrational, such as wishful seeing, then presentational phenomenology is not enough to guarantee that a state is an unjustified justifier. At the least, the claim that states with presentational phenomenology are unjustified justifiers must be restricted to states that are not based on reasons.[44]

44. For additional objections to phenomenal conservatism, see Markie (2005, 2006, 2013), Lyons (2011), and McGrath (2013).

5.3. Innateness

The next two objections I consider come from the idea that in order for a state to have an epistemic status, it must be adequately sensitive to reasons. We do not want to critique states as unjustified if they were never the sorts of states that could respond properly to reasons in the first place, such as brute reflexes. This line of thought is redolent of some views of moral responsibility on which an attitude must be sensitive to evaluative judgments in order for us to be morally responsible for that attitude (Scanlon 1998; Smith 2005). One might worry that because core object representations are produced by an innate and modular system, they do not display the requisite sort of reasons-sensitivity for having epistemic statuses.

I will first consider this worry from the innateness angle. In contrast to information that comes from perceptual learning, the constraints of the core object system are likely fixed from birth, with signatures appearing as early as two months (Aguilar and Baillargeon 1999).[45] There may be some development of the sophistication of infants' ability to reason about objects' stability and support relations over the first year of life (Baillargeon, Needham, and DeVos 1992), but the constraints of the core object system are not malleable in the same way as, for example, learned visual correspondences between shape and color (Witzel et al. 2011). States that are innately hardwired are not appropriate candidates for epistemic evaluation in virtue of how they are formed because they are not formed on the basis of any other states in the first place.

However, while the constraints of the object system are largely innate and immutable, the outputs of the core object system are not. The outputs are generated in response to both the inputs and the constraints, so at any given time they are dependent on the stimuli one is presented with. My claim that core object representations are based on reasons and so have epistemic statuses concerns the outputs of the system, not the constraints. While the innateness of the constraints means that the outputs are formed by relying on the same reasons over time, this does not undermine the idea that the outputs are based on those reasons and so have epistemic statuses.

45. Additional evidence for the innateness of the core object system comes from studies with nonhuman primates revealing the presence of a core object system nearly identical to that of humans, indicating the system's shared evolutionary lineage (Hauser and Carey 1998, 2003; Uller, Hauser, and Carey 2001).

By point of comparison, consider someone who relies on a principle of induction widely and consistently in her reasoning. The principle says roughly that multiple particular observations together support a generalization. Her belief in the principle of induction may be sticky, in that even if she were to become convinced that the universe is wildly irregular, she would not be able to stop herself from performing induction. We would nonetheless find it apt to consider whether her beliefs formed on the basis of the principle of induction were justified or unjustified. While a lack of sensitivity of one's underlying reason may influence the particular sort of epistemic status one's beliefs merit (e.g., justified or unjustified, and to what degree), it does not preclude a belief from having an epistemic status at all. If the immutable nature of the reasons on which a state is based does not preclude that state from having an epistemic status in the case of beliefs, immutable underlying reasons should not preclude core object representations from having epistemic statuses either. The innateness of the constraints of the core object system does not jeopardize the epistemic evaluability of the system's outputs.

One might nonetheless wonder whether the constraints of the core object system themselves have epistemic statuses, so as to have a more complete picture of the epistemic role of core cognition.[46] While I do not have the space for a complete treatment of this issue here, I will sketch its parameters.

The constraints of the core object system do not seem to be based on reasons in the ordinary sense, because they are not formed and/or maintained in virtue of epistemic support. Because they are innate, the constraints are not formed in response to any incoming information whatsoever. They are maintained due to the fixed architecture of the system rather than due to any particular epistemic relations. The constraints' presence in the mind has more to do with the human evolutionary trajectory than with any particular instance of basing on reasons. So, the constraints do not meet the sufficient condition of basing on reasons for having an epistemic status (**RS**).

However, there may be routes to having an epistemic status other than basing on reasons. **RS** is a sufficient condition on having an epistemic status, not a necessary one. It is still possible, then, that the core cognitive constraints meet some other sufficient condition on having an epistemic status, despite their lacking an epistemic basis. For example,

46. I thank an anonymous referee for raising this question.

one might take being formed in response to evolutionary reasons over time to be sufficient for having an epistemic status. Or one might think that enabling a fundamental and extensive set of justified mental states is sufficient for having an epistemic status. The constraints of core cognition plausibly meet either of these potential conditions.

Alternatively, if one did not endorse any other sufficient conditions on having an epistemic status, the constraints of the core object system would function as unjustified justifiers, conferring immediate justification on the outputs of the system without themselves being epistemically evaluable. How the pieces fall with respect to the epistemic role of the constraints depends on one's other epistemic commitments, primarily the possibility of epistemic evaluability without basing on reasons.[47]

5.4. Modularity

I next consider the lack-of-sensitivity worry from the modularity angle. The modularity of the core object system limits the class of reasons to which core object representations are sensitive. Because the system is modular and informationally encapsulated, beliefs in central cognition do not influence how core object representations are formed. However, the fact that the class of reasons used in a state's formation is limited does not disqualify the state from have an epistemic status. Very often we want to say that a given belief has an epistemic status as unjustified precisely because it is not based on some of an individual's reasons. For example, consider a person who believes global warming is a hoax solely on the basis of what she hears on Fox News, despite also hearing and accepting various particular pieces of scientific evidence that the atmospheric temperature is increasing. We would say that her belief that climate change is a hoax is unjustified because it is based on too small a subset of her reasons. This case demonstrates that basing on a limited set of epistemic

47. Correspondingly, one might also wonder whether the constraints bear on one's epistemic character. I take the relation between epistemic evaluability and redounding on epistemic character to be straightforward: mental states with epistemic statuses redound on individuals' epistemic characters, while mental states without epistemic statuses do not. We may still need to appeal to such status-lacking mental states to explain some of an individual's behavioral or cognitive tendencies, but they do not make her more or less epistemically rational overall. So, if core cognitive constraints have epistemic statuses, they will bear on her epistemic character, and if they do not, they will not. The outputs of the core object system will nonetheless bear on her epistemic character, because their epistemic evaluability is not hostage to the epistemic evaluability of the constraints.

reasons is a factor that plays into epistemic evaluation, rather than one that exempts states from evaluability at all.

One might still wonder whether mental states formed by strictly modular systems should be given a different epistemic treatment from those formed on the basis of limited sets of reasons within central cognition. Yet some modularly formed beliefs are based on reasons and have epistemic statuses. Consider the cheater detection module, which is a specialized, informationally encapsulated system that relies on social cues to detect cheaters (Cosmides and Tooby 1992).[48] This module takes in inputs that indicate when individuals have reaped the benefits of a social agreement without paying the corresponding entry requirements. It then relies on stored information in the form of conditionals about how such agreements work, and produces beliefs classifying individuals as cheaters. Despite the fact that these beliefs are only sensitive to the inputs and the limited store of information in the module, it is nonetheless natural to say that when the module is working properly, the beliefs it produces about cheaters are justified because they are formed on the basis of reasons about the conditions on being a cheater and whether those conditions are met. For example, the automatic judgment that a sixteen-year-old drinking beer is breaking a rule seems justified, despite the fact that this judgment is the output of the cheater detection module rather than of a process of slow, deliberate inference in central cognition. If modularity in belief does not preclude states from having epistemic statuses, the modularity of the core object system should not preclude its outputs from having epistemic statuses either.

5.5. Voluntary Control

A related worry is that core cognitive processing is outside of the agent's voluntary control, and that only states under an agent's voluntary control are truly based on reasons and thereby have epistemic statuses. This position has connections to the debate over the criteria for moral responsibility, where some theorists take voluntary control (of at least some sort) to be a precondition for moral responsibility (e.g., Fischer and Ravizza 2012). This view originates in the Kantian doctrine of "ought implies can" (Kant [1787] 1997). One might hold that there is an analogous notion of epistemic responsibility for which voluntary control is also required, and that

48. For criticism of the view that there is a cheater detection module, see Sperber, Cara, and Girotto (1995).

we must be epistemically responsible for a state in order for it to have an epistemic status.[49] One might then object to the epistemic evaluability of core object representations on the grounds that they are not voluntarily formed.

There are a number of reasons to question voluntary control requirements on responsibility, in both the moral and epistemic domains. First, there is debate over whether ordinary belief formation is typically under voluntary control, calling into question the legitimacy of voluntary control requirements on normative evaluation (Alston 1989). Even granting that some belief formation is voluntary, volitionalism is not the only game in town. There is a prominent set of nonvolitionalist views on the conditions on responsibility, which deny that control is required for responsibility for attitudes or actions (e.g., Adams 1985; Scanlon 1998; Smith 2005; Arpaly 2006; Sher 2006). Such views offer alternative conditions on responsibility, such as the appropriateness of asking for reasons for an attitude or action (Scanlon 1998), or an attitude's standing in rational relations to our evaluative judgments (Smith 2005). These views have the significant advantage of accommodating many of our most basic normative practices of evaluation. Nonvolitionalist views can explain how and why we hold people morally responsible for involuntary omissions, such as forgetting a good friend's birthday (Smith 2005), or leaving a dog in a hot car (Sher 2006). They can also explain why we hold people responsible for outbursts of uncontrolled anger, and for the actions that ensue from them.

The **RS** condition on epistemic evaluability that I argue for here shares much in spirit with nonvolitional accounts of moral responsibility. In both cases, the conditions for normative evaluation have to do with a state's relations to reasons, rather than with properties tied to the perspective of the subject, such as consciousness or control. Nonvolitionalist views also have a distinct explanatory advantage in the epistemic domain. For example, a nonvolitionalist about epistemic responsibility can explain why we might hold someone responsible for booking conflicting appointments, deeming her irrational, even though she did not voluntarily choose to do so (Siegel and Silins 2015). Nonvolitionalist views also allow us to give epistemic credit where it is due, such as when a deft logician auto-

49. In the rest of this section, I take the scopes of epistemic evaluability and epistemic responsibility to be the same. The states that are epistemically evaluable are the ones for which we are epistemically responsible. One might argue that these notions can come apart, but for my purposes here they can be treated as having the same extent.

matically arrives at the answer to a logic problem through unconscious reasoning, the regulation of which is outside of her voluntary control. A volitionalist about epistemic responsibility will have trouble dealing with all such cases in which a state is involuntarily formed yet our common practice says to accord it an epistemic status. These sorts of cases across normative domains push strongly against a voluntary control requirement on normative evaluation.[50]

Applying this nonvolitionalist idea to core cognition, I claim that subjects are epistemically responsible for the outputs of core cognition, despite the fact that these states are produced outside of their control. The transitions of the core object system and the resulting object representations are processes and states of the individual, in the sense that they are attributable to her and redound on her normative standing. Epistemic responsibility goes hand in hand with epistemic evaluability. When we consider what we are like as epistemic agents overall, the scope of consideration includes at least some of the inner happenings of our automatic modules, not exclusively our voluntary belief formation in central cognition. Core cognition exemplifies how the heart of the basing relation can be present in uncontrolled processes. The fact that core cognitive states and processes are outside of our voluntary control does not preclude them from being a part of us.

To illustrate this point further, many of the examples I have already offered in response to the previous objections also directly target the idea that basing on reasons requires voluntary control. Unconscious modus ponens reasoning and the expert pilot's judgments both operate automatically and involuntarily, outside of the agent's control. The cheater detection module is likely outside of even indirect voluntary control, given the strong evidence that it is innate. These examples illustrate that even restricting our consideration to belief formation, control does not seem to be necessary for the basing relation. So, lack of control should not rule out core object cognition as an instance of basing on reasons.

5.6. Implicit Representations

The next objection comes from the idea that the constraints of the object module may be implicit rather than explicit, and that only explicit rep-

50. There is, of course, much more to say on behalf of both the volitionalist and nonvolitionalist camps, but these additional epicycles are beyond the scope of this article. For further defenses of nonvolitionalist positions, see Scanlon (1998) and Smith (2005).

resentations can be reasons on which a state is based. By 'implicit', I mean embodied in a transition rule. By 'explicit', I mean represented outright, in the content of a state.[51] A standard example of implicit representations is the rules of generative grammar that operate within the language faculty (Chomsky 1986). If the constraints of the core object system are implicit, there are no states stored within the object module with the content that if an object has a certain set of spatiotemporal properties, it is solid, bounded, coherent, and so on. Instead, the system simply responds to inputs of certain sets of spatiotemporal properties by producing outputs that represent objects and have the inferential role dictated by attributions of solidity, boundedness, coherence, and so on. The constraints are rules of cognitive architecture that govern the system's operation.

The psychological evidence has not decisively shown whether the constraints of the core object system are implicit or explicit. I next consider how it might impact my arguments if they turn out to be implicit.[52]

Paradigmatic cases of basing on epistemic reasons involve explicit reasons. For example, when a juror deliberates during a trial and forms a belief that the defendant is guilty on the basis of the reasons that (1) the defendant had a strong motive and that (2) the defendant's fingerprints were found on the murder weapon, the juror's belief is based on explicit reasons. It is central to the notion of successful basing that one state provides epistemic support for another. One might worry that implicit representations are not fit to play the role of providing epistemic support. Transition rules simply tell us how to move from one state to another, hopefully while preserving truth. They may not themselves seem to provide epistemic support, but instead merely facilitate its transmission.

Would the implicit nature of the constraints of the core object system preclude the outputs from being based on reasons? A first point is that even if the constraints are implicit, there is still some aspect of the overall reason that is explicit. I proposed earlier that the input and the solidity constraint together constitute the reason on which the output is based. The objection from implicitness only affects the constraint,

51. The terms 'implicit' and 'explicit' are used in a variety of ways. For example, they are sometimes used to mean 'unconscious' and 'conscious', respectively. They are also sometimes used to pick out whether or not additional inferences are required to extract information from a system. While these alternative notions may be in some ways relevant to the question at hand, to prevent confusion I stick to the definitions outlined in the text above.

52. Carey favors a view on which the constraints are implicit (Carey 2009: 104).

because there is no reason to think the inputs (which are representations of sets of spatiotemporal cues) are implicit. At least part of the reason on which the output is based is explicit, so the process is not such a far cry from a typical instance of basing on explicit reasons.

A second point is that despite the fact that stereotypical cases of basing involve explicit reasons, it is plausible that mental states can in fact be based on implicit reasons. The paradigm case of basing on reasons as deliberation on a jury need not perfectly extend to all cases. Consider beliefs formed in response to information stored implicitly in the language faculty. When someone is presented with a sentence and judges that it is poorly formed without being able to articulate why, it seems right to say that her judgment is based on her reason of, for example, the underlying phrase structure principle, even if that principle is stored as a transition rule in the language faculty.

Or consider again the cheater detection module, which produces beliefs classifying individuals as cheaters. The criteria for cheater-hood stored in the module (such as that if someone is under twenty-one, it is illegal for her to drink) may be stored as transition rules rather than as explicit states, but we would nonetheless say that an individual's belief that someone is a cheater is based on the criteria for cheater-hood embodied in the constraint. For example, we would say that our automatic belief that a sixteen-year-old drinking beer is doing something illegal is based on our knowledge of the age requirements on drinking, even if this knowledge is stored as a rule that modulates transitions between beliefs about age and beliefs about illegal behavior.

Some cases of expertise may also involve basing on implicit reasons. For example, much of the seasoned pilot's knowledge of aviation may be stored as transition rules that govern how she responds in certain contexts rather than as the explicit content of mental states. We would nonetheless say that her belief about how best to land the plane is based on reasons about when different angles are appropriate, even if this knowledge is implicit.

In these examples, when a mental state is based on implicit reasons, the epistemic merit of the transition rule modulates the epistemic status of the outputs, just as it would if it were an explicit state. Our grammatical judgments are justified precisely because of the way the rules of the language faculty work together with linguistic inputs to give rise to verdicts about the acceptability of sentences. In individuals with properly functioning language faculties, the phrase structure principles, in conjunction with sentential inputs, epistemically support judgments of gram-

maticality. For example, the rule that nouns but not verbs are optionally preceded by determiners (Chomsky 1957), in conjunction with an input of the sentence 'We often go walking on Sundays and then the have a picnic,' gives rise to a justified belief that this sentence is ungrammatical. The input alone is not sufficient to confer an epistemic status of justified on the output, because the input says nothing about what sentence forms are acceptable. It is the particular nature of the implicit phrase structure principle, and the epistemic support it lends when combined with the input, that makes the output justified.

Similarly, the pilot is justified in her belief about how to angle the plane in virtue of the expertise that is housed in the principles governing her skillful responses. To see more precisely how the epistemic quality of implicit representations might modulate the quality of outputs, compare two pilots who form the same belief about how to angle a plane in a given context: a first who has just recently past her licensing exam, and a second with a decade of experience flying. We would likely say that the second pilot is more justified in her belief. The implicit rules that store her expertise and guide her belief formation confer additional justification due to her more extensive experience. To continue the comparison in the other direction, a third aspiring but still unlicensed pilot, with minimal experience and overhasty mechanisms of encoding implicit rules, might happen to form the same belief about the correct way to angle the plane through a lucky guess, even if the rules according to which her system operates are of poor overall epistemic quality. This lucky amateur would be unjustified in her belief due to the poor quality of the implicit rules she relies on, despite her chance accuracy.

Returning to core cognition, if its constraints are implicit, they will similarly modulate the epistemic quality of its outputs, helping to confer a positive justificatory status upon them. As in the case of the language faculty, core cognitive constraints are crucial to the epistemic support provided for the outputs, because the spatiotemporal information represented in the inputs alone is not sufficient for representing objects as solid, bounded, coherent, and so on.[53] If it turns out that the constraints

53. In the cases of both the language faculty and core cognition, the constraints are innate, so experience-based variation in the epistemic quality of the constraints will not occur in the way it does in the pilot example and other cases of learned expertise. There may still be instances of the constraints of these systems malfunctioning or of individuals with selective deficits. Whether such occurrences reduce the epistemic support the constraints provide depends on whether one thinks the constraints are unjustified justi-

of the core object system are implicit, core object representations will nonetheless have epistemic statuses, as indicated by the wide range of plausible cases of basing on implicit reasons.

5.7. *Not at the Border*

The last objection I consider has a slightly different target from the previous six. Those objections all questioned whether core object representations meet the conditions on having an epistemic status, given certain psychological features. What I call the "not-at-the-border" objection instead grants that core object representations are based on reasons and have epistemic statuses, but claims that this conclusion is not really news about a borderline case of perception and cognition. Instead, it claims that as a matter of descriptive psychological fact, core object representations fall neatly into our extant psychological categories. I address three versions of this objection in turn, and argue that whatever sorts of states core object representations turn out to be with respect to the perception/cognition border, my arguments lead to a significant shift in the epistemic landscape.

One version of the not-at-the-border objection says that object representations are purely perceptual states. This position is often advocated on the grounds that we can entirely explain subjects' performance on tasks such as object tracking and identification by only appealing to perceptual capacities (see Bogartz, Shinksey, and Speaker [1997] and Melkman and Rabinovitch [1998] for strong versions of this view, and Pylyshyn [2001] and Scholl [2001] for more moderate articulations of it).

If core object representations are in fact strictly perceptual states, then the upshot of my arguments is that some perceptual states can be based on reasons and thereby have epistemic statuses. This upshot would be even more destabilizing to the traditional picture of the stark divide between perception and cognition than my original conclusion as stated about a borderline case. If core object representations are entirely perceptual, basing on reasons and epistemic evaluability extend not only as far down as the border of perception and cognition but also have tendrils into perception itself.[54] While proponents of the traditional idea that

fiers or are themselves epistemically evaluable. For further discussion on this point, see section 5.3.

54. For a defense of the view that perception is epistemically evaluable, see Siegel (2017).

perception is never epistemically evaluable may balk at this outcome, my arguments so far regarding lack of awareness, presentational phenomenology, modularity, and voluntary control, show that at least the core cognitive type of perceptual state is apt for having an epistemic status.

A second version of the not-at-the-border objection says that core object representations fall neatly on the cognition side of the perception/cognition border. Some psychologists have claimed that core object representations must be cognitive because they parse the world into discrete units, which is not a task within the realm of perception (Spelke 1988).[55] Core cognition's key role in the ontogenetic origin of concepts also ties it closely to cognition (Carey 2009). This version of the objection would threaten to reduce the significance of my conclusion that core cognitive states have epistemic statuses, because having an epistemic status is a standard property of cognitive states.

A first point in response to this objection is that the view that core object cognition is purely cognitive has fallen out of favor among psychologists, and for good reason. As noted in section 2, there is a broad base of evidence that the outputs of the core object system are the same representations that are used to visually track objects (Scholl and Leslie 1999; Carey and Xu 2001). Core cognition is also perception-like in its inputs, automaticity, innateness, modularity, and phenomenology. Given these features, core cognition simply does not appear to be a purely cognitive system.

There is a plausible position in the vicinity, though, which is that the core object system is a borderline perceptual/cognitive system that produces cognitive states. While the picture I have been operating with says that core object cognition has borderline processing that produces borderline outputs, this proposal says that core object cognition has borderline processing (e.g., modular like perception but with rich constraints like cognition), but produces strictly cognitive outputs. The truth of this proposal depends on exactly what makes a given state cognitive or perceptual. Given the elusive nature of the perception/cognition distinction (for discussion, see Beck 2018; Quilty-Dunn 2019; Burge 2010a,

55. Spelke has since revised her view and now holds, in line with Carey, that core cognitive systems are at the border of perception and cognition (Carey 2009; Spelke n.d.). The explanation for Spelke's change in view is in part historical. In her earlier work she advocated the view that core object representations are beliefs in order to provide stark opposition to skeptics who denied that core cognition was interestingly distinct from ordinary perception.

2010b; and Block n.d.), even if this proposal were correct, my arguments that core object representations are based on reason would still have substantive epistemic implications. Even if core object representations are beliefs or other cognitive states, their formation is significantly different from standard belief formation. The view I argue for here expands the domain of states that can be epistemic reasons to include unconscious outputs of early perceptual input analyzers and constraints stored within innate, modular systems. It is a substantive epistemic discovery that basing on epistemic reasons can begin so close to the interface between the world and the mind.

A third version of the not-at-the-border objection says that core object representations involve a mix of purely perceptual and purely cognitive states. This position asserts that the core object system is a heterogeneous set of mechanisms that generate multiple types of mental representations for performing different tasks (Block n.d.). The psychological evidence speaks against such heterogeneity and in favor of a single unified object system through the convergence of success conditions across multiple experimental paradigms (Scholl and Leslie 1999; Carey and Xu 2001; Carey 2009). Furthermore, even if the mixed view were true, there would be significant epistemic implications. The mixed view and my arguments taken together would imply that some purely perceptual states are based on reasons and so have epistemic statuses, and some purely cognitive states are based on reasons that reside farther down in the mind than previously thought possible. Whether the core object system turns out to be purely perceptual, purely cognitive, a mix of both, or squarely at the border, acknowledging that core object representations are based on reasons causes the epistemic landscape to undergo a major transformation.

6. Conclusion

I have argued here that core object representations are based on epistemic reasons, and so have epistemic statuses as justified or unjustified. Given that core object representations are formed on the basis of reasons that do provide epistemic support, they will likely have epistemic statuses as justified to some degree. The details depend on one's particular views about how various factors influence justificatory status. Regardless of how these details shake out, the epistemic role of core object representations is more like the standard epistemic role of belief than that of perception.

However, my arguments do not merely neatly slot core object cognition into the belief side of the traditional divide, leaving the overall epistemic picture unchanged. By examining a particular borderline case of perception and cognition in detail, I have made headway toward unearthing which psychological properties are also critical epistemic properties and which are not. The fact that a mental system is unconscious, modular, responsive to sensory input cues, implicit, and in many ways paradigmatically perceptual does not preclude it from involving basing on epistemic reasons.

My arguments here open the door for the idea that other types of states that have been traditionally considered outside the scope of epistemic evaluability, such as perceptions, may in fact be based on reasons and so have epistemic statuses. From here on out, the task is to examine other potential unconventional instances of basing on reasons with just as careful an eye to the psychological details as I have given to core object cognition here. Ripe candidates include cases in which the formation of a state is dependent upon a particularly rich store of information that may serve as reasons. Examples include the core agent and number systems, perceptual learning, crossmodal interactions, and causal perception. While there may be a joint in nature between perception and cognition, the normative joints in the mind do not all neatly map onto it.

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