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On the Matter of Essence

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Abstract

A large literature suggests that people attribute the inborn properties of living things to their essence. Here, I explore the possibility that the essence of living things must be further *embodied*, and that this presumption guides intuitive reasoning about *all* of an organism's inherited properties, physical and psychological. Accordingly, when people reason about agentic living things (animals and humans), they presume that (a) Their essence must exhibit the properties of bodily matter— it must occupy a certain location in space, and it must be comprised of some appropriate organic substance that is anchored in the body; (b) Inborn (essentialized) traits must be embodied, and conversely, embodied traits are likely innate; and (c) The identity of biological kinds and by extension, one's psychological core, are defined by the material properties of their essence. I show that the embodiment hypothesis can capture numerous phenomena, ranging from laypeople's intuitions about which psychological traits are plausibly innate to their perception of the self and its capacity to migrate to humanoids and reemerge after death.

It is with much sadness and a distinct sense of loss that I write these words to honor Jacques Mehler's memory in the pages of his brainchild, the journal *Cognition*. Jacques' *Cognition* was a journal like no other—an arena of open debate on the foundational questions of our discipline. Reading the remarkable March, 1988 issue, dedicated to the debate between “symbolic” and connectionist accounts of cognition, the bubbling air of scientific audacity and innovation is still palpable. Those papers marked a formative moment in the coming of age of a generation of cognitive scientists.

Jacques' *Cognition* was a great bold read because, in one way or another, most *Cognition* papers went straight into the mouth of the lion, and fearlessly wrestled with questions of human nature and its malleability. These same concerns also guided Jacques' own inquiry into linguistic (e.g., Bertoni & Mehler, 1981; Bonatti, Peña, Nespor, & Mehler, 2005; Gervain, Nespor, Mazuka, Horie, & Mehler, 2008; Gómez et al., 2014; Hochmann, Benavides-Varela, Nespor, & Mehler, 2011; Nespor, Peña, & Mehler, 2003) and conceptual (Bonatti, Frot, Zangl, & Mehler, 2002) primitives (see also Mehler & Dupoux, 1994). They appear time and time again in the many *Cognition* papers he edited, and in the heated debates they inspired (e.g., Fitch, Hauser, & Chomsky, 2005; Lidz, Waxman, & Freedman, 2004; Marcus, 1999).

Looking back, however, one wonders whether those debates resolved any of the “burning questions in the field.” Surely, when it comes to the dreaded question of innateness, cognitive science today seems just as polarized and divided as it has ever been. So in honor of Jacques' memory, it is only befitting that we ask why.

In a new book (Berent, 2020), I suggest that our troubles with innateness could arise from the very workings of our psyche. Lila Gleitman, Jacques' dear friend, had foreseen these conclusions many years ago in her mantra that empiricism is innate. To be clear, my proposal strictly concerns folk psychology, not cognitive science. Indeed, just as physics is miles apart from folk physics, psychological and folk psychology need not be aligned. But since such intuitive biases plague human cognition and cognitive scientists are only human, we as cognitive scientists ought to be mindful of them.

The culprit—intuitive essentialism—is a familiar suspect, with a well-documented criminal history, so to speak. Essentialism—the belief that individuals are what they are by virtue of some immutable, underlying essence of their kind (Gelman, 2003; Gelman & Wellman, 1991; Keil, 1986; Medin & Ortony, 1989)—has been originally invoked to account for young children's ability to categorize biological kinds (e.g., Keil, 1986), to infer their inductive (Gelman & Markman, 1986; Gelman & Markman, 1987) and innate potential (Gelman & Wellman, 1991; Keil, 1986; Solomon, Johnson, Zaitchik, & Carey, 1996), and their underlying causal structure (e.g., Ahn et al., 2001; Keil, 1986; for review, Gelman, 2004). Essentialism has been credited for both young children's grasp of biological kinds (Gelman & Markman, 1986; Gelman & Wellman, 1991) and their understanding of “like father like son” (Gelman & Wellman, 1991), and blamed for laypeople's misconceptions about biological inheritance and evolution (Coley, Arenson, Xu, & Tanner, 2017; Kelemen, 2019).

Essentialism has been further invoked to capture laypeople’s beliefs about inherited psychological traits, including personality (Haslam, Bastian, & Bissett, 2004), emotions (Lindquist, Gendron, Oosterwijk, & Barrett, 2013), and gender (Eidson & Coley, 2014; Taylor, 1996), as well as their ill-conceived notions of genetic determinism (Dar-Nimrod & Heine, 2011), their prejudices concerning race (Dar-Nimrod & Heine, 2011), and the stigma associated with psychiatric illness (Ahn, Kim, & Lebowitz, 2017; Haslam & Kvaale, 2015) and dyslexia (Gibbs & Elliott, 2015). Indeed, if people believe that individuals (e.g., an individual woman, a member of a minority, or a depression patient), are what they are by virtue of the inherent underlying essence of their respective “kinds,” then it is no wonder that people would be prejudicial—they would *a priori* attribute the characteristics of an individual to the essence of their kind, and they would view these “essentialized” properties as fixed and immutable. Critically, since in naïve psychology the essence is inherited from one’s biological parents, it follows that essentialism guides intuitive reasoning about innateness.

But a closer look at people’s beliefs suggests that essentialism as it is typically conceived does not fully capture laypeople’s nativist intuitions. In what follows, I outline these challenges. In response, I suggest a modification to the common view of essentialism. I then proceed to demonstrate how this reconceptualization sheds light on a whole host of findings in numerous literatures, ranging from our intuitive beliefs about which psychological capacities are innate, to how we reason about humanoids and humans, about our true self, free will, and what happens when we die.

1. The Limits of Essentialism

If psychological essentialism guides our intuitive notion of innateness, then one would expect it to apply to all innate traits alike. It would indeed be surprising if people stated that “having two hands” is an inherited human trait, but “having two legs” is not. In our intuitive psychology, however, agentic natural kinds—animals and humans—are endowed not only with physical properties but also psychological ones. Since science has shown that several of these psychological traits are heritable (Bishop & Bates, 2020; Landi & Perdue, 2019; Montag, Ebstein, Jawinski, & Markett, 2020), and since laypeople’s perception of heritability can be closely aligned with scientific estimates (Willoughby et al., 2019), one would expect that, all things being equal, people should uniformly essentialize all human traits, both anatomical and psychological.¹ Moreover, our nativist intuitions (courtesy of essentialism) should be potentially uniform across distinct psychological traits. All things being equal, people should be equally open to the innateness of sensory and motor capacities, of emotions, and epistemic states (those capturing the contents of beliefs, knowledge, and wishes). But they are not.

¹ From this, it doesn’t follow that people should be equally likely to essentialize “having two arms” and “having a scar” on one’s forehead. The latter (the scar) has an obvious acquired source (the relic of a fall), whereas the former (two arms) does not. In this case, the condition that “all things be equal” is obviously violated.

Children know that offspring inherit some of their physical traits from their biological parents (Gelman & Wellman, 1991; Hirschfeld, 1995; Solomon et al., 1996). Whether preschool children indeed possess biological understanding has been debated (c.f., Gelman, 2003, 2004; Gelman & Wellman, 1991; Hirschfeld, 1995 vs. Carey, 1985; Keil, 1986; Solomon et al., 1996; Solomon, 2002), and indeed, four-year-olds credit biological parents not only with their offsprings' skin colors but also with the colors of their shirts (Solomon, 2002). By school age, however, children attribute inborn physical traits to their birth parents more selectively (Solomon et al., 1996), and this understanding emerges spontaneously in older children, even when their culture denies the role of biological inheritance (Astuti, 2004). For example, the ethnographic record shows that the Vezo culture does distinguish between biological and acquired traits. The Vezos believe that a child could be born with a club-foot because his mother used to tease a person that had a club-foot. Nonetheless, when the Vezos were invited to reason about an adoption situation, they still asserted that children resemble their biological parents more than their adoptive parents, and that this resemblance concerns bodily traits, but not their religion, for instance (Astuti, 2004).

Children, however, are less likely to credit offspring with their birth parents' psychological traits, even when these traits are not obviously learned (e.g., "being smart," Heyman & Gelman, 2000). Similarly, children consider behavioral aspects of gender (e.g., "plays with dolls") as less likely to be determined at birth than physical characteristics (Taylor, 1996); adults show similar asymmetry, especially when the opportunity for deliberate reasoning is diminished (due to the demand for fast responses, Eidson & Coley, 2014).

Moreover, innateness does not apply uniformly to all psychological traits. Children (Wang & Feigenson, 2019) and adults (Berent, Platt, & Sandoboe, 2019; Wang & Feigenson, 2019) believe that traits that capture epistemic states (hereafter, epistemic traits) are less likely to be innate than non-epistemic traits (sensations, actions, emotions), even when all the traits in question are demonstrably early-emerging and plausibly innate.

In one study (Berent et al., 2019), laypeople were presented with detailed (but somewhat simplified) descriptions of published research from infant cognition, complete with an explanation of the rationale of the research. When asked to predict whether young infants would prefer "helpers" to "hinderers," whether they recognize abstract number (2 lights = 2 sounds), and whether they prefer syllables like *blog* to *lbog*, participants either outright denied they would (for moral preferences and number) or responded at chance (for syllable structure).

These intuitions are flatly wrong—newborn infants are demonstrably sensitive to syllable structure and abstract number (Gómez et al., 2014; Izard, Sann, Spelke, & Streri, 2009), and the preference for "helpers" is evident in three-month-olds (Hamlin, Wynn, & Bloom, 2010). Yet laypeople believe that infants are devoid of these epistemic states. And when, in other studies, adults are explicitly informed that all traits—epistemic and non-epistemic—are inborn, laypeople still consider epistemic states as less likely to be innate (e.g., to emerge spontaneously in members of the species that are raised in a "desert island"

situation). So clearly, laypeople are biased against the possibility that epistemic states are inborn (Berent et al., 2019).

Curiously, emotions elicit the opposite bias. Not only do laypeople essentialize emotions (Lindquist et al., 2013), they tend to view emotional facial expressions as inborn (Berent, Barrett, & Platt, 2020). Laypeople (incorrectly) tend to conclude that newborn infants would spontaneously prefer happy faces to angry faces (Berent et al., 2019), and they presume that a hunter gatherer would spontaneously recognize the facial expressions of a Westerner (Berent et al., 2020). Moreover, people believe that basic emotions would be recognized spontaneously (i.e., innately), even when told these emotions are, in fact, acquired (Berent et al., 2020).

Taken at face value, these concerns are easy to dismiss outright. Indeed, earlier we explicitly stated that essentialist intuitions should be uniform *only if all things are equal*. Perhaps they are not—perhaps people have valid reasons to presume that epistemic states and emotions, for example, differ with respect to their innate potential.

One possibility is that empiricist intuitions arise from over-generalization—the belief that, if some instances of a psychological trait arise through learning, then so do all others. And since people know that some epistemic states (e.g., knowledge of math) are learned by schooling, they jump to the conclusion that all epistemic states must be learned. Empiricist intuitions could also arise because most laypeople are unaware of the rich mental life of infants, so their reluctance to credit infants with innate epistemic states could reflect innocent ignorance, unrelated to essentialism. Finally, there is the possibility that people are avert to innateness because they are concerned it can lead to social biases and discrimination (Pinker, 2002).

While these factors could certainly account for some of our biases, they do not suffice. First, if our biases are rooted in concerns about social injustice, then empiricist intuitions should target primarily socially-relevant concepts, such as personality and emotions, not epistemic traits such as the concept of “object.” But the observed bias is just the opposite: people are *positively* inclined to presume that emotions are innate, but they are *negatively* biased against the innateness of epistemic states. Social concerns do not account for such intuitions.

As to the overgeneralization of learning, we note that laypeople know too well that learning mediates not only the acquisition of knowledge (e.g., math and science) but also motor skills, such as swimming and riding a bike. So it is unclear why such considerations should predispose people against the innateness of epistemic states specifically. Moreover, as we will see next (in section 3.2.1), the presumption that epistemic states aren’t innate goes hand in hand with the presumption that epistemic states are disembodied. For the learning hypothesis, this link is utterly mysterious.

It is also unlikely that our empiricist intuitions only arise from plain ignorance. Indeed, people do not merely plead ignorance as to whether or not epistemic states are innate. Rather, participants in these experiments *actively* reject the notion that epistemic states are

innate, even when presented with detailed explanations of how one can gauge knowledge in young infants, and even when participants are presented with explicit evidence that the traits in question are in fact innate (Berent et al., 2019). Additionally, passive ignorance fails to explain why people positively essentialize emotional facial expressions despite evidence that these expressions are learned from experience (Berent et al., 2020).

So why do people essentialize physical properties more than psychological properties? And why are they positively inclined to view emotions as inborn, but believe that epistemic states are not? While the evidence presented thus far does not unequivocally point to essentialism, in what follows, I will argue that essentialism nonetheless informs these judgments. If it does, then we ought to explain why essentialism would lead to such nonuniform intuitions: why would it privilege anatomical over psychological traits, and why would it lead us to be reluctant to assume the innateness of epistemic states?

The contrast between traits of bodies and minds presents a diagnostic clue. This schism is, of course, the telltale sign of psychological dualism—another intuitive principle that is widely documented in laypeople (Bloom, 2004). People, indeed, tend to view the mind as immaterial, distinct from the physical body, and this is the case for adults (Chudek, McNamara, Birch, Bloom, & Henrich, 2018; Forstmann & Burgmer, 2015; Forstmann, Burgmer, & Mussweiler, 2012; Stanovich, 1989; Watson-Jones, Busch, Harris, & Legare, 2017), children (Chudek et al., 2018; Hood, Gjersoe, & Bloom, 2012), and possibly, infants (Kuhlmeier, Bloom, & Wynn, 2004; Spelke, Phillips, & Woodward, 1995).

Dualism not only explains why psychological traits are treated differently from physical properties of the body, it can further account for the differentiation between distinct psychological traits. Indeed, people are known to contrast psychological traits with respect to how closely they align them with the body (Berent, Platt, & Sandoboe, in press; Lindquist et al., 2013). People consider epistemic states as weakly anchored in the body (e.g., less likely to be localized in the brain, and to transfer to a replica of a human body, Berent et al., in press) and conversely, as more closely aligned with the ethereal mind. For example, adults and children consider epistemic states as most likely to persist in the afterlife (Berent et al., in press; Bering, 2002; Bering & Bjorklund, 2004; Bering, Blasi, & Bjorklund, 2005), and most susceptible to migrate out of the body (Chudek et al., 2018; Cohen & Barrett, 2008; Cohen, Burdett, Knight, & Barrett, 2011). For emotions, people showed the opposite intuitions, as emotions are essentialized (Lindquist et al., 2013) and perceived as likely to “show up” in facial expressions and to manifest internally (e.g., in the rumbling of one’s stomach; Berent et al., 2020); the results are detailed in subsequent sections.

So indeed, our intuitions about inheritance seem to align with our perceptions of embodiment: traits—physical or psychological—that are strongly embodied (that is, situated within the bodies of living things) are also the ones that are more likely to be perceived as inherited.

Could this association suggest causation? Could people perceive emotions and sensorimotor traits as prime candidates for inherited traits precisely *because* they consider them as embodied? If so, how does this embodiment-essence link arise: why would

essentialism target embodied traits as better candidates for perceived innateness (i.e., essence)?

2. The Embodiment Hypothesis

Here, I consider an answer to these questions. I suggest that when people reason about agentive living things (animals, including humans), they decidedly identify their inborn essence not with some ethereal minds, but rather with their bodies—they presume that the biological properties of animals arise from an essence that is hidden in their bodily innards. Since the body is perceived as material, so is the essence.

My proposal is limited, inasmuch as it concerns only a subset of the numerous phenomena that have been considered in the large literature on essentialism—the inborn properties of agentive living things, of animals and humans specifically; whether these ideas extend to non-agentive living things (plants) remains to be seen. Likewise, in what follows I will not consider social intuitions about traits that are patently acquired (e.g., religion, Chalik, Leslie, & Rhodes, 2017, and one’s native language, Hirschfeld & Gelman, 1997) as a priori, it is unclear whether such judgments rely on the same mechanisms that guide reasoning about biological inheritance, on their (partial) projections, or on entirely different principles (e.g., category membership, Platonic essence; for discussions see Gelman & Hirschfeld, 1999; Newman & Knobe, 2019; Solomon et al., 1996). I thus believe it is prudent to first explore the constraints on essentialist reasoning in the case of biological inheritance.

When it comes to the biological essence of animals—the properties that offspring have inherited from their biological parents—we perceive the essence not merely as an unconstrained placeholder (Medin & Ortony, 1989). Rather, the essence of animals must be anchored in their bodies, and thus it must be material. I further suggest that the embodiment hypothesis guides our reasoning about the organism *as a whole*—we require that innate traits be material regardless of whether the trait in question defines the anatomy of the organism, its presumed psychology, or its resulting behavior. I capture the embodiment hypothesis in (1).

(1) *The embodiment hypothesis*: the essence of agentive living things is materially embodied.

This proposal is not new. It goes back at least to Haslam and colleagues (2004), who hypothesized that people essentialize emotions because they perceive them as embodied—a prediction borne out by subsequent studies (Berent et al., 2020; Lindquist et al., 2013). Considering essentialist reasoning in children, Newman and Keil (2008) explicitly stated that “it may be incoherent to have a notion of essential features without some sense of how those features are physically instantiated” (p. 1353). But while the link between essentialism and embodiment has long been recognized, its consequences have not been systematically explored. Indeed, the embodiment hypothesis makes distinct testable predictions about the nature of essence (in laypeople’s minds), about which traits are

potentially essentialized (i.e., innate), and about how the essence defines kind identity, including the notion of the “true self.”

First, the *essence of animal kinds ought to exhibit the properties of bodily matter*—it must occupy a certain location in space (within their bodies), and it must be further comprised of some appropriate substance. What counts as “appropriate” is, in part, culturally-dependent (Cohen et al., 2011; Waxman, Medin, & Ross, 2007), but by hypothesis, the substance of essence must be minimally organic, and it must be localized inside the body

A second prediction concerns the perceived links between the presumed essence of animals and their innate traits. Several accounts have suggested that essentialist explanations are causal—the underlying essence of a living kind *causes* certain traits to emerge (Ahn et al., 2001; Gelman & Hirschfeld, 1999; Keil, 1986; Newman & Knobe, 2019). If matter is perceived to effect change only in matter (possibly informed by intuitive physics, Spelke, Breinlinger, Macomber, & Jacobson, 1992), then it follows that *inborn traits* (those caused by the material essence of animal kinds) *must be embodied*. Anatomical parts, such as wings and hands, patently illustrate innate traits that correspond to parts of the body. But innate traits could be also be perceived as embodied more subtly—by being linked to a sense organ (e.g., one sees “with their eyes”), or to a body part. This is also the case with emotions (they are perceived as “showing up” on one’s face) and motor acts (e.g., walking by moving one’s legs). All essentialized (i.e., innate) traits, however, must be at least anchored in the material body.

Once people link the inborn essence of animals to certain essentialized (inborn) traits, this link should allow for symmetrical inferences. Not only would knowing that an animal is a member of a kind (e.g., *dog*) license inferences about its innate embodied traits (e.g., having four legs), but conversely, the embodiment of traits would further inform inferences about their innate origins.² Thus, upon discovering that a given trait is firmly anchored in the animal’s body (e.g., fur color), one should now have greater confidence in the possibility that the trait in question is innate. This increase in confidence does not offer certainty, as some embodied traits are plainly acquired (e.g., a skunk was painted as a racoon, or is wearing a costume Keil, 1986). Accordingly, embodiment is not sufficient to establish an innate origin. Per the embodiment hypothesis, however, the embodiment condition is necessary, and consequently, the embodiment of traits offers a probabilistic cue suggestive of innate origin. Thus, upon learning that an agentive living kind possesses certain bodily properties, one would be more likely to interpret that trait as innate than if the trait were disembodied.

² This link between an animal as a kind and the materiality of its innate properties can also be captured as a formal explanation (Prasada, 2017). Formal explanation captures kinds in terms of their principled properties—those that hold for every member of the kind. And if animals are what they are by virtue of some innate material essence, then the properties of essentialized traits (including their materiality) must be true for all members of the kind—these traits must be principled. The embodiment hypothesis, then, predicts that materiality is not merely *possible* for some animal traits (Prasada, 2017), but rather it is *required*.

Finally, if the material essence determines kind identity (e.g., ducks are distinct from swans by virtue of their distinct embodied essences), then the specific material properties of essence would inform inferences about kind identity. Thus, an individual (e.g., Donald) would not be considered a member of a certain kind (e.g., duck) unless it possesses the requisite material essence characteristic of that kind; a rubber duck wouldn't do. Similarly, a human-like humanoid is an imposter, as it is devoid of the proper material substance characteristics of humans. And by the same token, the "true me" might be defined by some material essence of my body, not merely my ethereal mind/soul. These predictions (summarized in (2)) are evaluated in subsequent sections.

2) Some predictions of the embodiment hypothesis:

- a) Essence must exhibit the properties of bodily matter—it must occupy a certain location within the body, and it must be comprised of some appropriate bodily substance.
- b) Innate traits and their features
 - i) Innate traits must be embodied.
 - ii) Embodied traits are likely innate.
- c) Kind identity is determined by the possession of essentialized bodily properties.

A few words of caution before we proceed. First, in what follows, I evaluate the possibility that the embodiment hypothesis constrains reasoning about the inheritance of physical and psychological traits. Essentialism, however, is only one of the many constraints on laypeople's reasoning. For example, when people evaluate the embodiment of psychological traits, they might consult not only intuitive knowledge of essentialism but also their formal education about psychology and neuroscience. Indeed, Western adults know that psychology "happens" in the brain, and such knowledge could very well counteract their intuitive biases about the disembodiment of certain traits. For these reasons, if the embodiment hypothesis is true, we expect its effects to be not absolute but *relative* (e.g., embodied traits should be *more* likely to be perceived as inherited). Second, while I will evaluate the embodiment hypothesis against a broad range of evidence, I will not offer an exhaustive literature review. In light of these limitations, I will not seek to convince you that the embodiment hypothesis is proven true. Rather, my hope is to point out that this view merits careful consideration.

3. The Predicted Properties of Essence, Innate Traits, and Animal Kinds

3.1. Where is the essence?

The first prediction of the embodiment hypothesis is that the perceived essence of animal kinds ought to exhibit the properties of bodily matter—it must occupy space (specifically, within their bodies), and it must be identified with some appropriate bodily substance.

Several observations are consistent with this possibility. When young infants reason about the properties of offspring (e.g., why a dog is brown like its mother), they invoke a *gemmule*—some tiny piece that is transmitted from the mother to offspring (Springer & Keil, 1991).

Like all matter, this presumed essence must occupy place in space. Indeed, children insist that the essence of living things is physically localized in their “insides.” Three-year-old children believe that the insides of a pig are more similar to a cow than to a piggybank (Gelman & Wellman, 1991). Even eight-month-old infants expect agents to have “insides.” Accordingly, they are surprised to discover that novel objects that appear to be animate (agentive and self-propelled) are hollow, but they do not project similar expectations for inanimate objects (Setoh, Wu, Baillargeon, & Gelman, 2013).

Not only must the essence reside in the “insides” but it must be further localized at the center of an organism. Thus, when asked to determine what kind of animal is buried in a frozen glacier, kindergarteners insist that the sample be taken from the animal’s center. Critically, the “center” constraint only applies to animals. Thus, children do not require that the sample be taken from the center when they attempt to discover whether the glacier contained a rock or a mineral (Newman & Keil, 2008).

Finally, children not only believe that animal kinds possess an essence that is embodied, but they further believe that the essence must be comprised of a specific substance. For example, native-American Menominee and Brazilian children believe that if a baby cow was transfused with the blood of a pig (its adoptive parent), then the cow would turn into a pig, due to the centrality of blood/blood quantum in their culture (Sousa, Atran, & Medin, 2002; Waxman et al., 2007). In contrast, Yukatec Mayan (Atran et al., 2001) and American children (Waxman et al., 2007) do not believe that blood transfusion alters the animal’s kind. So clearly, the choice of the appropriate essential substance is partly set by experience. Nonetheless, the requirement that the essence is linked to some organic substance appears to be general. Even Western adults are more likely to credit a robot with human properties (Monroe, Dillon, & Malle, 2014) and human identity (Blok, Newman, Behr, & Rips, 2001) if a person’s cognitive capacities (their memories, or free will) and also their flesh (i.e., their brain) has been transplanted into it.

Whether the choice of the appropriate bodily vessel of essence is systematically constrained across cultures is an open empirical question. But inasmuch as the intuitive notion of “matter” is shaped by core knowledge of physics, and matter is seen as the property of solid entities that move cohesively and continuously (Spelke & Kinzler, 2007), then it is conceivable that solid bodily substances (e.g., bone and flesh) might be better carriers of essence than gas (e.g., breath), for instance.³ This question awaits future research.

The available evidence, however, suggests that essentialist reasoning is constrained with

³ This proposal is consistent with the possibility that intuitive notions such as “material” or “innate” are gradient, but they arise from the conflict between multiple core-knowledge constraints that are discrete.

respect to the physical location of essence (in the insides/center) and its substance (e.g., blood, brain), in that both are properties of matter. Thus, laypeople's beliefs are in line with the hypothesis that they perceive the essence of animals as embodied.

3.2. Which traits are potentially innate?

If people believe that the essence of animal kinds is the cause of their inherited traits, and if they further believe that matter can only exert an effect over matter (not mind), then they would expect inherited traits (those that are caused by the kind's material essence) to be likewise material—they should be patently anchored in the physical body (i.e., embodied). Upon learning that offspring inherited a given trait from their biological parents, people would thus be inclined to assume that this trait forms part of their physical bodies, rather than their ethereal psyches. Accordingly, when people seek to determine which traits are likely inherited, they should be more likely to identify innate traits as ones that are embodied (i.e., ones that fulfill the materiality condition for innateness) compared to disembodied traits.

Moreover, the link between the (material) essence and (material) inherited traits should be bidirectional. Not only does essence license inferences about what type of traits are innate, but conversely, the embodiment of traits is suggestive of their innateness. As noted, the embodiment of a trait does not prove an innate origin: even young children know that a horse does not inherit the scrapes on his legs from its biological parent (Springer, 1992). But if people believe that innate traits must be embodied, then embodiment could nonetheless offer a probabilistic cue for innateness. Thus, upon learning that a trait of a living kind is embodied, people should now be more likely to presume that the trait in question is also innate.

In what follows, I evaluate these two predictions, albeit not quite in this order. I start by asking whether innateness and embodiment are merely linked. I next examine whether embodiment implies innateness, and finally, I examine the converse—the key hypothesis that, per essentialism, innateness implies embodiment.

3.2.1. Innate Traits are Embodied

Several results suggest that essentialized (innate) traits are embodied. First, children are more likely to identify the innate characteristics of living things with physical properties of their bodies than with their psychological traits. As noted, kindergartners believe that a person is more likely to inherit their foot size and ear shape from their biological parents than psychological traits, such as being intelligent, smart, and outgoing (Heyman & Gelman, 2000). Similarly, children believe that physical gender characteristics (having a girl's body) are more likely to be determined at birth compared to gender-stereotypical behaviors (e.g., playing with dolls, Taylor, 1996), and so do adults, even when required to provide fast (hence, less deliberate) responses (Eidson & Coley, 2014).

Second, people are more likely to essentialize psychological traits that are strongly

embodied. In line with this possibility, Lindquist and colleagues (2013) found that emotions (e.g., anger, fear) are rated higher than “cognitions” (e.g., thoughts, ideas, daydreams, meditations) on features such as naturalness, preexistence, stability, and inherence—properties that are associated with natural kinds (e.g., nuts, pine trees) and bodily states (e.g., awake, hunger). Lindquist and colleagues concluded that “categories whose instances are tied to the body (e.g., hunger) are more essentialized than are categories that are thought to exist in the mind (e.g., memory)” (Lindquist et al., 2013, p. 641). Their experiments, however, did not directly evaluate the embodiment of emotions, nor did they evaluate how embodiment is linked to essentialist intuitions about inheritance. A subsequent study explicitly addressed those questions (Berent et al., 2020).

In one experiment, adult participants rated emotions with respect to both their embodiment and their innate potential. To evaluate embodiment, participants were invited to consider whether a given emotion would “show up” in the face or manifest internally in the body. Innate potential, in turn, was defined as the propensity of an emotion to arise spontaneously (Samuels, 2004). To determine the innate potential of these emotions, participants were asked to evaluate how likely it is that these emotions would be recognized spontaneously by a hunter gatherer who had no previous contact with Westerners.

Results showed that people perceived emotions as both embodied (as imprinted in the face and in the internal body) and innate, and perceived embodiment and innateness of emotions correlated—the stronger the perceived manifestation of an emotion in the body, the more likely people were to view it as innate. Moreover, when people considered basic emotions, such as anger and disgust—ones perceived as firmly embodied—they viewed them as innate, even when they were explicitly informed that research suggests that these emotions are in fact acquired (Berent et al., 2020). These results support two conclusions. First, that people view emotions as both embodied and inborn (i.e., essentialized). Second, the belief in innate emotions is a bias that persists despite evidence to the contrary.

Epistemic states (e.g., knowledge that “objects are cohesive”) offer a complementary test for the embodiment hypothesis. Unlike emotions, epistemic states are perceived as relatively disembodied. When asked to predict which properties of an agent (a hamster or a human) are likely to transfer to a replica of its body, children (Hood et al., 2012) and adults (Berent et al., in press; Forstmann & Burgmer, 2015) state that epistemic states are less likely to migrate with the body. But when they consider manipulations that transfer only the mind, here it is epistemic states that are considered most likely to migrate (Chudek et al., 2018; Cohen & Barrett, 2008; Cohen et al., 2011) and persist in the afterlife (Berent et al., in press; Bering, 2002; Bering & Bjorklund, 2004; Bering et al., 2005). Additionally, adults believe that epistemic states are less likely to manifest in the brain (relative to non-epistemic states, Berent et al., in press). Correspondingly, children struggle to recognize that the brain is the “container” of one’s thoughts, while they readily apply this notion to physical properties (e.g., the stomach contains food; Gottfried, Gelman, & Schultz, 1999).

If people believe that essence must be embodied, then epistemic states should be the least likely to be essentialized. Indeed, when asked to determine whether epistemic states are

likely to be inborn, adults (Berent et al., 2019; Wang & Feigenson, 2019) and children (Wang & Feigenson, 2019) believe they are not, even when the traits in question are plausibly innate (i.e., ones that are observed across cultures and in young infants). In fact, people consider epistemic states as less likely to be innate (relative to non-epistemic states, such as sensations, emotions, and actions) even when they are explicitly told these traits *are* innate. This empiricist bias is further general—it has been documented in reasoning about the epistemic states of humans, animals, and aliens (Berent et al., 2019).

As expected, non-epistemic traits (here these are psychological traits corresponding to sensations, actions, and emotions, as opposed to one's epistemic states) elicit the opposite intuition—people believe that sensations, actions, and emotions are both embodied and innate—and the stronger the perceived anchoring of these traits in the material body, the stronger their perceived innateness (Berent et al., in press). Together, the results for epistemic and non-epistemic traits (emotions, actions, and sensations) demonstrate that essentialist intuitions are firmly linked to embodiment.

Not only does the embodiment hypothesis explain intuitions about the innateness of typical psychological traits, it can also capture intuitions about the origins of psychological disorders. Dyslexia is a case in point. Research on dyslexia suggests that, in alphabetic orthographies like English, dyslexia is typically associated with difficulties in phonological decoding of printed words (e.g., linking the letter *c* with the sound /k/) and in phonemic awareness (e.g., recognizing that *cat* is comprised of three sounds); this condition is moderately heritable, and linked to several genes (for reviews: Hulme & Snowling, 2016; Peterson & Pennington, 2012; Seidenberg, 2018). But laypeople's perceptions of the disorder diverge from the science in systematic ways. Laypeople tend to correctly recognize that dyslexia is an inborn condition (Furnham, 2013). Surprisingly, however, laypeople typically believe that dyslexia arises from (sensory) visual difficulties, such as letter reversal, and not from cognitive difficulties with phonological decoding (Castillo & Gilger, 2018; Furnham, 2013; Macdonald, Germine, Anderson, Christodoulou, & McGrath, 2017; Washburn, Binks-Cantrell, & Joshi, 2014).

Why do people correctly recognize that dyslexia is heritable, yet systematically mistake it for a visual sensory disorder? The embodiment hypothesis predicts that these two attitudes are intrinsically linked: people view dyslexia as a sensory visual disorder precisely *because* they believe the condition is inborn. If people know that dyslexia runs in families, and if (per the embodiment hypothesis) people further believe that innate (i.e., essentialized) conditions must be embodied, then people should conclude that dyslexia is more likely to arise from deficits perceived as embodied (compared to deficits considered ethereal).

Recent results are in line with this possibility (Berent & Platt, 2021a). In these studies, laypeople were invited to reason about two matched cases of reading disorders. One case featured an individual with visual symptoms (the confusion of *b* with *p*); another showed problems in phonological decoding (e.g., the failure to recognize that *kat* sounds like an animal name). As expected, people considered the (embodied) visual symptoms as more indicative of a reading disorder (compared to the difficulties with phonological decoding),

and they also considered the visual symptoms as more likely to be innate. Moreover, the perceived innateness of the symptoms correlated with their perceived embodiment (i.e., as a brain disorder).

Altogether, people show a persistent tendency to identify innate characteristics with traits that are readily embodied—either anatomical, sensory, or emotive. This tendency is evident in young children and adults, and it applies to reasoning about both typical conditions and the atypical case of dyslexia. In all cases, people are negatively biased against the possibility that epistemic states are innate, whereas they are positively biased to consider sensory (e.g., visual symptoms in dyslexia) and emotive facial expressions as inborn.

The embodiment hypothesis offers a ready explanation for this fact. But of course people could also presume that innate traits are embodied for other reasons. For example, people might reject the innateness of (immaterial) epistemic states because they recall their own learning experiences; this might be especially likely for reading, whose acquisition is prolonged and laborious. More generally, mindreading intuitions could lead us to presume that knowledge arises from three sources only (sensation, inference, and communication), so there is no need to postulate innateness as a fourth (innate) source (Carruthers, 2011, in press). There is also the possibility that people have set their beliefs by external sources—they might have read reports that attribute dyslexia to visual causes, and it is these reports, rather than any assumptions about the essence, that are the cause of their intuitions. As we will see next, however, the link between our intuitions about innate essence and materiality are *causal*. When people are provided with evidence that a given trait is embodied, their nativist intuitions increase. We now turn to the evidence.

3.2.2. Embodiment Increases the Perception of Innateness

In a series of experiments, my colleagues and I examined whether the embodiment of a psychological trait can enhance its perception as innate.

One set of experiments manipulated embodiment by targeting people's attitudes about the mind-body divide generally (Berent et al., in press). One group of participants read a passage suggesting that the mind and the body are one and the same (a manipulation that encourages the view of psychological traits as embodied, in line with physicalism; see Forstmann & Burgmer, 2015); another group read a passage suggesting that the mind is distinct from the material body (a manipulation that deemphasizes embodiment, and encourages dualism). Participants were next presented with a list of psychological traits of infants—either epistemic (e.g., recognizing the number of objects) or non-epistemic (e.g., making a fist)—and asked to evaluate their innateness (i.e., will the trait emerge in infants spontaneously, even if raised on a desert island?). Results showed that the physicalist condition showed a small, but significant increase in the perception of innateness.

Another experiment applied the same manipulation while participants considered the dyslexia symptoms described in the previous section. Results showed that participants in the physicalist condition were more likely to view dyslexia as heritable (i.e., as likely to

transfer to a person's clone) compared to participants in the dualist condition (Berent & Platt, 2021a). Together, these results suggest that embodiment increases the perception of innateness.

In the experiments discussed thus far, embodiment was manipulated by altering people's attitudes toward the mind/body divide *generally*. Another set of experiments manipulated embodiment by presenting participants with information about the embodiment of *specific traits* (Berent et al., in press).

Here, participants were informed that a given psychological trait is either known to correspond to a specific location in the brain (in so doing, establishing a firm link to the body), or that its localization is unknown, and in fact, scientists are even unsure whether this trait is localized in the brain at all (i.e., devoid of explicit evidence for embodiment). With this information in mind, participants were next presented with a list of adult traits that were either epistemic (e.g., having a concept of a person) or non-epistemic (e.g., squatting down), and asked to evaluate their innateness (operationalized as the propensity of the trait to emerge spontaneously in a group of individuals raised on a desert island). Results showed that traits presented as embodied (i.e., localized in the brain) were perceived as more likely to be innate (Berent et al., in press). Similarly, when participants were informed that the symptoms of dyslexia were detectable by a brain scan, people perceived the condition as more likely to transfer to a genetic clone (i.e., innate), compared to when the same symptoms were detected behaviorally (Berent & Platt, 2021a).

Together, these results suggest that the link between innateness and embodiment (materiality) is causal: traits that are embodied are more likely to be perceived as innate. Moreover, this link guides reasoning about both typical conditions and the atypical case of dyslexia.

Further evidence for the effect of embodiment on the evaluation of clinical cases is presented by the public's attitudes towards psychiatric conditions. A large public campaign (1999) sought to destigmatize psychiatric disorders by presenting them as "diseases like all others"—conditions that ravage the body (Pescosolido et al., 2010). This campaign partly bore fruit, inasmuch as laypeople have become increasingly aware that psychiatric disorders are biogenetic conditions (Pescosolido et al., 2010; Schomerus et al., 2012). Surprisingly, however, once people became aware that psychiatric disorders are anchored in the body, they became more pessimistic about their prognoses, suggesting that people also perceive biogenetic disorders as immutable (for meta-analyses: Kvaale, Haslam, & Gottdiener, 2013; Loughman & Haslam, 2018; for review: Ahn et al., 2017). Other results show the converse: when informed that a disorder is difficult to cure (i.e., immutable), people inferred that the disorder is biological (Haslam & Ernst, 2002). Additionally, people tend to project biogenetic conditions to patients' relatives, suggesting they believe that they are heritable (Bennett, Thirlaway, & Murray, 2008).

Immutability and inheritance are, of course, the telltale signs of essentialism, so the increase in the perceived heritability and immutability of biogenetic conditions suggests that people tend to "essentialize" them (Dar-Nimrod & Heine, 2011; Haslam & Ernst, 2002).

In fact, people tend to associate biological psychiatric conditions with poorer prognoses, and greater dangerousness, and they have a stronger desire to distance from the patient, even when these disorders are merely presented as “brain conditions” (without invoking any genetic factors, Loughman & Haslam, 2018). These results suggest that people might have interpreted the brain origin of the disorder as suggesting an innate origin.

In line with this possibility, when people are provided with evidence that a psychiatric condition affects the brain (i.e., they are detectable in a brain test), they are more likely to perceive it as innate compared to when the same condition is detected by a matched behavioral test (which does not explicitly implicate the brain), and correspondingly, stigma increases (Berent & Platt, in press).

To be clear, the perception of brain conditions as inborn is entirely unmotivated. Modern neuroscience suggests that all psychological states are brain states, regardless of whether they are innate or acquired. So observing that a given trait/symptom “shows up” in a brain scan provides no evidence that the trait in question is innate. Yet, people presume it is. This conviction, found in reasoning about both typical and clinical conditions, suggests that, in naïve psychology, the embodiment of the trait (in the brain) offers evidence for its innateness (i.e., as defining one’s essence).

This finding can also shed light on why laypeople are known to be irrationally fascinated with the brain (Fernandez-Duque, Evans, Christian, & Hodges, 2015; Hopkins, Weisberg, & Taylor, 2016; Rhodes, Rodriguez, & Shah, 2014; Weisberg, Keil, Goodstein, Rawson, & Gray, 2008; Weisberg, Taylor, & Hopkins, 2015). If people presume that traits that are embodied (e.g., show up in a brain scan) are innate, then brain scans would be perceived as speaking not only to the workings of our minds, but also our innate essence, so brain scans would be assigned a special significance.

All these results, then, are in line with the embodiment hypothesis. If people presume that one’s innate essence is embodied, then embodiment would offer a probabilistic cue for innateness. Embodied traits, then, would be viewed as likely innate. In fact, if the possession of embodied essence is *necessary* for innateness, then we should also expect the converse. Upon learning that a given trait is innate, people should further conclude that the trait in question is embodied. This prediction is also borne out by the evidence.

3.2.3. Innateness Increases the Perception of Embodiment

A series of experiments (Berent et al., in press) evaluated whether people believe that innate psychological traits are embodied. To gauge embodiment, participants were asked to consider a situation in which the body of a person/creature was replicated; we reasoned that traits that are perceived as embodied ought to be perceived as ones that are likely to transfer to that replica. The main question was whether people believe that innate traits are embodied. If they do, then upon learning that a given trait is innate, they should be more likely to view it as embodied, hence, as more likely to transfer to the replica. Results were in line with this prediction, and they obtained in four different experiments, featuring traits of both humans (adults and infants) and nonhuman creatures (birds and aliens).

Summarizing, the results discussed in section 3.2 suggest that the perception of inheritance (courtesy of essentialism) is systematically linked to embodiment. We first showed that the perception of innateness and embodiment are linked. We next showed that the embodiment of a trait increases its perceived innateness. Finally, we showed that innateness increases the perception of embodiment.

In most cases, however, the effect of these biases was small and relative. For example, people did not categorically respond that innate traits must be material. Rather, people were *more likely* to view traits presented as innate as material relative to traits presented as acquired. Nonetheless, the systematic biases we have documented suggest that people causally link the inborn essence to matter.

3.3. What manipulations can alter a kind?

Essentialism not only supports our intuitions about the inborn traits of animal kinds but also offers a way to differentiate one kind from another. It is the essence of the dog that renders it distinct from a cat, for example. And since the essence is perceived as immutable, children believe that skunks will always remain skunks, even when their appearance is changed (Keil, 1986). Correspondingly, the removal of an animal's insides is perceived to alter its kind and function, but they are relatively unaffected by the removal of its outsides (Gelman & Wellman, 1991). And in cultures that link the essence to blood, its removal (via blood transfusion) alters the kind identity (Sousa et al., 2002; Waxman et al., 2007).

In fact, it is not only humans that consider the insides critical for kind identity. Rhesus monkeys do the same. Monkeys expect that a fruit (e.g., an apple) will maintain its kind despite changes to its exterior (e.g., being wrapped in a coconut shell, Phillips, Shankar, & Santos, 2010). These results suggest that essentialist reasoning is evolutionarily old, and that it can guide the identification of natural kinds even in the absence of language.

Since humans are biological kinds defined by both physical and psychological attributes, essentialist reasoning could similarly differentiate one person's psychological identity from another, and track the invariance of their "true self" across different circumstances and developmental stages (De Freitas, Cikara, Grossmann, & Schlegel, 2017; Strohminger, Knobe, & Newman, 2017). Thus, to preserve one's identity, it is critical that their essence be preserved, whereas, to migrate it to some new vessel (other than one's body), their essence must transfer to its new destination. Critically, if the essence is embodied, then the consequence of any manipulation to kind identity (biological or psychological) should depend not only on the integrity of one's mind but also on one's bodily essence. Several findings indeed link kind identity to the body.

3.3.1. Preserving One's Identity

In one set of experiments, people were asked to evaluate what conditions are necessary to preserve a person's identity. People typically assert that the preservation of one's memories is paramount—without his memories, Jim is not himself (Blok et al., 2001). But

when told that Jim lost his memories, and asked whether Jim would still feel pain, people stated that he would, suggesting that Jim's body contributes to the maintenance of his identity even when his memories are erased (Nichols & Bruno, 2010).

Further evidence for the role of the body in maintaining kind identity is found in reasoning about hominoids. Here, people are presented with an extreme situation in which the only way to preserve a person is to implant their brain into a robot. As expected, people believe that the preservation of memory is critical. But when the procedure further maintained the person's brain (as opposed to merely downloading his memories into a computerized robot), the preservation of the self was perceived as more robust (Blok et al., 2001).

Similar results obtain when kind membership is evaluated by the perceived capacity of humans and humanoids to exhibit free will. People consider a person's moral character to be central to their identity (De Freitas et al., 2017; Newman, De Freitas, & Knobe, 2015; Strohminger et al., 2017; Strohminger & Nichols, 2014, 2015), and when they evaluate one's moral character by their actions, the capacity to will those actions freely (Nichols, 2011; Nichols & Knobe, 2007; Roskies & Nichols, 2008; Sarkissian et al., 2010) and intentionally (Barrett et al., 2016; Greene & Cohen, 2004; Nichols, 2011) is usually critical. While good intentions do not always excuse bad actions, across cultures one's intentions certainly count (Barrett et al., 2016).

In most cases, however, people attribute freely willed acts to the mind and not to the body. Indeed, a large literature shows that when one's actions can be attributed to biochemical factors (Heath, Stone, Darley, & Grannemann, 2003; Monterosso, Royzman, & Schwartz, 2005) or the brain (Aspinwall, Brown, & Tabery, 2012; Gurley & Marcus, 2008), blame attribution usually decreases. All this suggests that one's essence—the true self—is gauged by its free will, which, in turn, is aligned with one's mind (Strohminger et al., 2017). And of course, the fact that this aspect of our essence reflects the mind, not the body, stands in stark contrast to the embodiment hypothesis.

But even when people evaluate one's moral essence, there is evidence that the material body still counts. To be sure, merely having a human body is not sufficient for free will. Thus, when people evaluate an akratic human, afflicted with a brain disorder that prevents him from acting on his thoughts and emotions, participants consider the person as devoid of free will, intentional agency, and the capacity for causal intervention and choice (Monroe et al., 2014). This is all expected, given that free will requires the capacity to choose one's acts. Interestingly, choice is necessary, but not sufficient.

When people next evaluated the moral fiber of an advanced robot who is endowed with the capacity to make decisions, recognize options, and pick among them, their verdict still did not differ from the akratic human. Thus, despite the ability to choose its action, the disembodied robot was not considered able to freely will its acts. Crucially, when a cyborg was fitted with a human brain, people's perception shifted. They then believed the creature was capable of choice, intentional agency, and free will (Monroe et al., 2014). Apparently, the capacity to decide and choose did not turn a plain robot into a free willing intentional agent, but the transplant of one's flesh did.

3.3.2 *The True “Me”*

Matter matters not only for cyborgs but also for human moral identity. As noted, there is evidence that people believe that “deep down,” people possess an immutable “true self” (for reviews: De Freitas et al., 2017; Newman et al., 2015; Strohminger et al., 2017). While the self can commit acts that are either good or bad, the “true self” is credited only with good acts (De Freitas & Cikara, 2018; De Freitas et al., 2018; Molouki & Bartels, 2017; Newman, Bloom, & Knobe, 2014; Tobia, 2016). Even children believe that a person’s good psychological traits are inborn and immutable (Heiphetz, 2019), whereas their bad traits will improve over time (Lockhart, Chang, & Story, 2002).

Since the true self is defined in moral terms (Freitas et al., 2017a; Newman, De Freitas, & Knobe, 2015; Strohminger et al., 2017), and since moral appraisal typically references one’s free will (e.g., Greene & Cohen, 2004; Nichols, 2011), which is usually aligned with the mind, the true self has likewise been viewed as immaterial (Strohminger et al., 2017). All this would seem to suggest that the true good self is decidedly ethereal—contrary to the embodiment hypothesis.

But upon a closer look, this conclusion is uncertain. Since the valence of the “true self” (as good) and the embodiment of free will are usually evaluated in separate experiments, it is not immediately clear whether the true self is indeed disembodied. The resulting question, then, is what people would say if they were required to evaluate both attributes of the true self simultaneously—its moral goodness and its embodiment.

To find out, Melanie Platt and I presented people with a modern reincarnation of the Dr. Jekyll and Mr. Hyde scenario (Berent & Platt, 2021b). The protagonist, John, exhibited puzzling shifts in his moral character. Some of his acts were decidedly positive (e.g., helping an old woman cross the street), others were squarely negative (e.g., posting hate messages on Facebook). John underwent two tests of his personality—a brain (i.e., a test that explicitly references the body) and a behavioral test (which does not)—and the results invariably conflicted. One test (e.g., the brain test) indicated that John’s fiber was good; the other (e.g., the behavioral test) indicated the opposite.

This scenario thus allowed us to ask whether participants identified John’s true character as good or bad, and whether their decision was informed by John’s body or mind (i.e., by the brain or the behavioral test). To further determine whether people invariably identified John’s moral core with his essence, we asked them to evaluate John’s true self along two distinct questions: (a) Whether John committed his acts freely (a notion that is typically critical for moral appraisal; e.g., Greene & Cohen, 2004; Nichols, 2011), and (b) Whether his acts reflect his essence.

Results to the two questions diverged. People invariably considered freely willed acts as good, and that was the case irrespective of whether the acts were explicitly linked to John’s body (i.e., regardless of whether they were diagnosed by the brain or the behavioral test). This is in line with previous results suggesting that the true self is good (De Freitas & Cikara, 2018; De Freitas et al., 2018; Molouki & Bartels, 2017; Newman et al., 2014; Tobia,

2016), albeit not necessarily immaterial (if it were immaterial, then people should have identified John's essence only with good acts that are not explicitly embodied, i.e., with the behavioral, but not the brain test. The results countered this prediction).

The critical question, though, is whether the "good true self" also reflects John's essence. Results suggested that it did not. Indeed, when asked to explicitly evaluate John's essence, people invariably based their decisions on the outcomes of the brain test, irrespective of whether the outcomes presented John as good or bad.

These results support two conclusions. First, our "true good self" is distinct from our essence, suggesting that in our eyes, there is possibly more than a single "true me"—one aligned with our good moral core; another with our bodily essence. Second, to evaluate a person's essence, people gauge their body (i.e., the outcomes of the brain test). These results are in line with the hypothesis that essence is embodied.

3.3.3 *Once We're No More*

The embodiment hypothesis can explain not only reasoning about embodied creatures, human and humanoid, but also about disembodied ones—those that exist in the afterlife. The afterlife is an unusual place to probe for essentialism, because essence is typically the hallmark of life (Inagaki & Hatano, 2004), not death, and because, as noted earlier, people usually align the afterlife with the person's ethereal mind, not with their body (Berent et al., in press; Bering, 2002; Bering & Bjorklund, 2004; Bering et al., 2005). Nonetheless, one's "true self," as we just noted, is (partly) aligned with one's essence (Berent & Platt, 2021b; De Freitas et al., 2017; Strohminger et al., 2017), which, as we have seen, is anchored in the material body (Berent & Platt, 2021b).

Which one of our identities, then, transfers to the afterlife upon the demise of the body? Do we only keep our immaterial mind, stripped of any of its material characteristics, or do we also credit the dead with some material attributes of their bodies?

Several results support the latter hypothesis. One line of evidence is presented by the ethnographic record, suggesting that beliefs about the afterlife often appeal to specific bodily properties. For example, in the Druze religion, one's soul can only reincarnate in a person of the same ethnicity and gender: a Druze can only reincarnate in another Druze, and a woman can only reincarnate in a woman (Halabi & Horenczyk, 2019). Similarly, in the Aztec tradition, the soul is a three-part entity, whose parts are each embodied in different material substance (*teyolia* is associated with the heart; *tonali* is associated with the blood; and *ihiyotl* is linked to breath and bodily gases). When a person dies, the soul is thus constrained with respect to the material entities it can inhabit. For example, the *teyolia* of a dead child can reside in a particular bird (*yolototl*, "the bird of the heart") or in other children (Lomnitz-Adler, 2005). In present day Mexico, food and drink are offered to the dead on the Day of the Dead. This notion of a "hungry dead" is clearly at odds with the view of a disembodied mind/soul.

These conclusions are also in line with experimental findings on people's reasoning about

the related situation of mind migration. In these experiments, participants (from the UK and from the Marajo Islanders of the Brazilian Amazon) were invited to imagine that they were to leave their bodies. When asked to imagine which vessel—a plant, a rock, or no vessel at all—would support one’s psychological capacities outside their bodies, participants showed systematic preferences. While the “appropriate” vessel varied across cultures (the British participants preferred plants; the Brazilians accepted both plants and rocks equally), the choice of that vessel systematically depended on which psychological trait transfers. Embodied traits (traits considered as less likely to migrate overall, mostly, perceptual bodily states) were more likely to migrate with the “appropriate” vessel (compared to no vessel), whereas for disembodied traits (those that are prone to migration, mostly epistemic states), participants preferred no vessel at all (Cohen et al., 2011). Such precise alignment of mind migration with matter is unexpected in a purely ethereal view of essence, but it is predicted by the hypothesis that one’s essence resides in the body.

The embodiment hypothesis could further explain why the essence of the living is thought to be contagious—for example, no one would like to wear a murder’s sweater, even when assured the sweater had no contact with the body (Nemeroff & Rozin, 1994; Rozin, Markwith, & McCauley, 1994; Rozin & Nemeroff, 2002)—and why people refuse organ donations from suicide victims (relative to victims of homicides), and why people believe that the preferences of the living (e.g., in food and color) transfer with their organs (Bering, 2018). Contagion is a property that people decidedly attribute to bodily matter, and it requires physical contact (Nemeroff & Rozin, 1994; Rozin et al., 1994; Rozin & Nemeroff, 2002). The fact that one’s essence can contaminate matter thus presents evidence that the essence is embodied. The dead, it turns out, are not entirely ethereal after all.

4. Conclusions

In this essay, I sought to shed light on our intuitive understanding of the nature of living things. Specifically, I considered the possibility that our ideas about the inborn capacities of agentive living things (animals and humans) arise from a notion of “essence” that is embodied, and thus, material.

In support of this possibility, I have shown that people attribute to essence properties of bodily matter—it occupies space, and it is aligned with specific organic substances. I have next shown how this presumed materiality of essence can explain which traits people view as inborn (i.e., attributable to essence) and conversely, why people tend to consider embodied traits as more likely to be innate. Finally, I considered how the embodiment hypothesis explains a number of curious properties of the self—what is our “true self,” which manipulations are necessary to preserve the self, and which conditions can alter the self, and allow it to reincarnate or otherwise persist after death.

While these results are all consistent with the embodiment hypothesis, the empirical case for embodiment is hardly settled. As noted, in most cases, the effects of embodiment are subtle. For example, people are more likely to consider embodied traits as innate (Berent et

al., 2020; Berent & Platt, 2021a; Berent et al., in press) and in some experiments they even categorically reject the innateness of epistemic states (Berent et al., 2019). But for the most part, the effects discussed here are relative, not absolute. I believe this should not be surprising, given that participants (mostly Western adults) know too well that all psychological capacities are linked to the brain, knowledge that could very well keep their intuitive essentialist biases at bay. But this explanation clearly ought to be evaluated.

The proposal advanced here also raises crucial conceptual questions about the nature of the embodiment constraint, its origins, and its scope. Throughout this discussion, I have drawn parallels between essentialist reasoning about biological and psychological capacities and suggested that they both require embodiment. Whether essentialist reasoning in these domains relies on shared principles, and whether they are psychological (Carey, 1985) or biological (Atran et al., 2001) remains to be seen.

Other questions concern the origins of essentialist reasoning generally, and the embodiment constraint specifically. Proposals concerning the origins of essentialism vary widely, from the suggestion that essentialist reasoning is a domain-specific system, most likely in the specific service of “folk biology” (Atran, 1990; Atran et al., 2001; Barrett, 2001) to domain-general mechanisms (Gelman, 2003), shaped by capacities such as inherence heuristics (Cimpian & Salomon, 2014a, 2014b), formal explanation (Prasada, 2017), and natural language (Rhodes, Leslie, & Tworek, 2012).

Similar questions extend to the origins of the embodiment constraint. One possibility is that this constraint targets living things specifically—either via essentialism, or as a constraint on the formal explanation of natural kinds (Prasada, 2017); another possibility is that the embodiment hypothesis arises from core knowledge of objects (Spelke, 1994; Spelke & Kinzler, 2007). As noted, if per naïve physics only matter can effect change in matter, then the cause of the body’s material properties (i.e., its essence) ought to be likewise material. How the embodiment constraint emerges is an open question.

The scope of the embodiment constraint across living things is also uncertain. Throughout the discussion, I have mostly addressed animals and humans, i.e., agents. Since some of the earliest evidence for the “insides” constraint (possibly, a manifestation of embodiment) comes from agents (Setoh et al., 2013), and since agentic living things afford the contrast between reasoning about bodies and minds, animals and humans presented a convenient test case. Essentialist reasoning, however, also applies to plants (Gelman & Wellman, 1991; Keil, 1986). Whether the embodiment constraint would extend therein remains to be determined.

Finally, there is an urgent need to evaluate the scope of the application of the embodiment hypothesis cross-culturally. Given previous documentation of essentialist reasoning in non-western cultures (Astuti, 2004; Atran et al., 2001; Cohen et al., 2011; Sousa et al., 2002; Waxman et al., 2007), including cultures that reject the role of innate potential (Astuti, 2004) in young infants (Setoh et al., 2013) and indeed, in nonhumans (Phillips et al., 2010), there are reasons to believe that essentialist reasoning is not confined to WEIRD (Western, Educated, Industrialized, Rich, Democratic; Henrich, Heine, & Norenzayan, 2010)

populations. A critical open question, then, is whether non-WEIRD people would spontaneously view the essence as embodied.

Returning to Jacques Mehler, whose memory I wish to honor, I regret that I never had the opportunity to discuss the science of essentialism with him. But when served dinner, Jacques would vehemently refuse “anything that has ever had wings.” Essentialism must have been very much on his mind.

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