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The selective advantage of representing correctly

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Abstract

Here is a widespread but controversial idea: those animals who represent correctly are likely to be selected over those who misrepresent. While various versions of this claim have been traditionally endorsed by the vast majority of philosophers of mind, recently, it has been argued that this is just plainly wrong. My aim in this paper is to argue for an intermediate position: that the correctness of some but not all representations is indeed selectively advantageous. It is selectively advantageous to have correct representations that are directly involved in bringing about and guiding the organism's action. I start with the standard objection to the claim that it is selectively advantageous to represent correctly, the 'better safe than sorry' argument gand then generalize it with the help of Peter Godfrey Smith's distinction between Cartesian and Jamesian reliability and the trade-off between them. This generalized argument rules out a positive answer to our question at least as far as the vast majority of our representational apparatus is concerned. But this argument fails to apply in the case of the correctness of a special kind of representation, one that is directly involved in bringing about, and

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in guiding, actions. We can still maintain that it is selectively advantageous to have a reliable mechanism for producing representations of this kind.

1 | INTRODUCTION

Quine famously said that representing correctly is evolutionarily advantageous:

> Creatures inveterately wrong in their inductions have a pathetic but praiseworthy tendency to die out before reproducing their kind (Quine, 1969, p. 126).

Quine's dictum seems to capture something intuitively appealing: those animals who represent correctly are likely to be selected over those who misrepresent. Many philosophers followed Quine in holding a version of this claim (just a couple of examples: Nozick, 1981; Papineau, 1987, 1993). Even Jerry Fodor, who is not known for his sympathy for evolutionary arguments said that, "Darwinian selection guarantees that organisms either know the elements of logic or become posthomous" (Fodor, 1981, p. 121). Daniel Dennett, a more likely follower of the Quinian approach, says that "Natural selection guarantees that most of an organism's beliefs will be true" (Dennett, 1987, p. 75). And there are many others (some representative quotes: Goldman, 1986, p. 98; Lycan, 1988, p. 142; Millikan, 1984, p. 317,[1] ; Papineau, 1987, pp. 77–78).

There is a bit of variety as to what mental states are the ones that are supposed to be selectively advantageous, if correct. Quine talks about 'inductions', Fodor about 'logic', Dennett about beliefs. Most philosophers followed Dennett in narrowing down the debate to the question whether having true beliefs is something that was evolutionarily advantageous (see for example, Papineau, 1987; Stephens, 2001). But the problem can be generalized to the correctness of any kind of representation. So the question is: is it selectively advantageous to represent correctly?

And the problem with answering this question is the following. Of course, it would be selectively advantageous to have a representational apparatus that represents all properties of the environment all the time and does so correctly. But this is not the kind of representational apparatus actual organisms are endowed with. We are finite beings and our representational capacities are also finite. We can only represent a very limited set of the properties of the objects in the extremely complex and ever-changing world around us.

Suppose that the only food an organism, O, can digest is apple. A pretty good foraging strategy for O then seems to be that if it represents an object as red and round, it should go and eat it. But this will be an all around successful strategy only if there is a perfect match between red and round objects and apples in the environment. If there are also red and round poisonous mushrooms around, then this strategy will prove to be disastrous. And if food is scarce but there are also green and yellow apples around (that O will be missing out on), it will also prove to be disastrous.

In fully accommodating environments (for example, in an environment where all and only red and round things are apples), it seems uncontroversial that representing correctly is selectively advantageous. But this is irrelevant as in real biological cases no organism lives in fully

[1] Note that Millikan's account is more complex from this point of view as she is very much aware of the challenges (along the lines of the better safe than sorry worry) that this paper is about, see esp. Millikan 1993.

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accommodating environment. And given the variability of environments (and of organisms), even if for a magical moment the environment is fully accommodating, this is likely to last only for a very short time. Environments are not fully accommodating. But then the answer to the question about whether it is selectively advantageous to represent correctly in these not fully accommodating environments becomes much more difficult to answer.

Before turning to this question, it is important to make a distinction between questions about the selective advantage of having correct token representations and the selective advantage of having a reliable representation-producing apparatus. I will assume throughout the paper that the question of the selective advantage of representing correctly is about reliable representation-producing apparatus. The reason for this has to do with the simple fact that the question about the selective advantage of having a correct token representation is not particularly interesting: depending on how we understand the term 'contributes', the answer is either a trivial 'yes' or a trivial 'no'.

There is a sense in which a correct token representation can contribute to the organism's survival in many, maybe even most environments – in the sense of raising the probability of reproductive success in certain cooperating environments. But if we want a stronger notion of contribution to reproductive success, it is important to note that no correct token representation will *guarantee* selective advantage. I may believe, correctly, that there is a tiger in front of me, but if I also believe that tigers are harmless animals that are playful and love to be teased, then the action these two beliefs will lead to are unlikely to enhance the chances of my survival. I have a true belief but because it is hooked up to a false one, having this true belief does not contribute to my fitness.

Conversely, I may believe falsely that there is a tiger in front of me (when, as a matter of fact, it is a delicious chocolate cake), but if I also believe falsely that tigers are edible and delicious, then I may attempt to eat the object in front of me, which, in this case, will contribute to my fitness. This false belief, of course, if it is combined with true beliefs is unlikely to contribute to my fitness, but there are scenarios (ones where I combine two false beliefs) where it does contribute to my fitness to have this false belief.

So the question about whether it is selectively advantageous to have correct token beliefs is not a particularly interesting question. The question about whether it is selectively advantageous to have a reliable belief-producing mechanism, as we shall see, is an interesting one, but we still need to answer this question (for much more complicated reasons) in the negative.

The plan of the paper is the following. In Section II, I outline the most influential objection to the claim that it is selectively advantageous to represent correctly, the 'better safe than sorry' argument. I then generalize this problem with the help of Peter Godfrey Smith's distinction between Cartesian and Jamesian reliability and the trade-off between them and argue that this rules out a positive answer to our question at least as far as the vast majority of our representational apparatus is concerned (Section III). But we can still maintain that it is selectively advantageous to have a reliable apparatus for producing a special kind of representations, ones that are directly involved in bringing about, and in guiding, actions (Section IV, V and VI). The main claim of the paper is that the correctness of these representations is indeed selectively advantageous.

2 | THE 'BETTER SAFE THAN SORRY' ARGUMENT

Here is a brief argument against the Quinian optimism about the selective advantage of representing correctly:

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> A very cautious, risk-aversive inferential strategy – one that leaps to the conclusion that danger is present on very slight evidence – will typically lead to false beliefs more often, and true ones less often, than a less hair-trigger one that waits for more evidence before rendering a judgment. Nonetheless, the unreliable, error-prone, risk-aversive strategy may well be favored by natural selection. For natural selection does not care about truth; it cares only about reproductive success. And from the point of view of reproductive success, it is often better to be safe (and wrong) than sorry (Stich, 1990, p. 62; Stich first made this point in Stich, 1981, see esp. p. 345, see also Plantinga, 1993 and Sober 1994).

Following Stephens, 2001 (p. 162), I will call this argument the 'better safe than sorry' argument. The main idea is this. If the occurrence of a certain kind of event has a huge cost for the organism, then indicating mechanisms that produce lots of false alarms but that indicate this event each time it occurs are favored over indicating mechanisms that do not produce any false alarms (thus, that represent the occurrence of events of this type more correctly), but at least sometimes fail to indicate when the disastrous event occurs. Thus, an indicating mechanism that misrepresents more often seems to contribute to the organism's fitness more than one that misrepresents less often. Correct representation in this selective regime does not seem to be evolutionarily advantageous.

An example may be useful. Take two mice, mouse A and mouse B. Mouse A has a cat-indicator that goes off each time there is a very slight chance that a cat is approaching. Say, it goes off if *anything* is approaching. And each time this 'approaching cat' representation is activated, the mouse runs away. Most of the time this representation will be incorrect: it represents an approaching cat, but in fact there are no cats are approaching, but, say, the shadow of a plane causes the activation of this representation. In other words, mouse A will misrepresent most of the time, but as it will run away even at the slightest sign of an approaching cat, it is unlikely to ever encounter an approaching cat.

Mouse B is much less jumpy. Its cat-indicator goes off only if something is approaching that smells like a cat and has visible whiskers. Thus, this representation does not go off when the shadow of a plane is passing through. This representation is likely to be correct more often than mouse A's representation, as it gives less false alarms. This cat-indicator, however, is not going to go off if a cat with no whiskers approaches. And if this happens, then mouse B is unlikely to survive. Thus, there are selective regimes (namely, selective regimes with lots of whiskerless cats) where mouse A is selected over mouse B, in spite of the fact that mouse B's representation is more likely to be correct than mouse A's. Again, correct representation does not seem to be selectively advantageous.

One may wonder how frequently we encounter those selective regimes where misrepresenting is the better strategy. Dennett's way of countering the 'better safe than sorry' argument (in Dennett, 1981 and Dennett, 1987, where he is reacting against Stich, 1981) is to argue that these scenarios are few and far between. As he says, "I do not think it is obvious that it is ever advantageous to be designed to arrive at false beliefs about the world, but I have claimed that there are describable circumstances—rare circumstances—where it can happen" (Dennett, 1987, p. 96, see also Dennett, 1981, p. 45, n. 12). This is a questionable strategy, as in every environment where eating is not too costly (or dangerous) but where food is scarce, will be one where the misrepresenting mouse A is better off than the correctly representing mouse B. But we can generalize the problem even further.

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3 | GENERALIZING THE PROBLEM: TWO KINDS OF RELIABILITY

The aim of this section is to generalize the insight from the better safe than sorry argument using Peter Godfrey Smith's distinction between Cartesian and Jamesian reliability (see Godfrey-Smith 1991 and 1996).

The concept of reliability is ambiguous: we can differentiate two senses in which this concept is used: as maximizing true beliefs or as minimizing false beliefs. Following Godfrey Smith, I will say that the Cartesian reliability of a belief-producing system is high if it minimizes false beliefs. The Jamesian reliability of a belief-producing system is high if it maximizes true beliefs. To put it differently, Cartesian reliability implies that the conditional probability of p given the agent's belief that p (Pr (p | Bel(p)) is high. Jamesian reliability, in contrast, implies that the conditional probability of the agent's belief that p given p (Pr (Bel(p) | p)) is high (Godfrey-Smith 1996, pp. 247–253, see esp. p. 251 and see also Godfrey-Smith 1991, 1992; Hartley Field calls them 'head-world reliability' and 'world-head reliability, respectively (Field 1990). 'Cartesian reliability' minimizes false beliefs, whereas 'Jamesian reliability' maximizes true ones. Or, as statisticians would say, low Cartesian reliability leads to Type I errors, whereas low Jamesian reliability leads to Type II errors.

Importantly, as Godfrey-Smith points out, there is a trade-off between these two kinds of reliability (Godfrey-Smith 1996, p. 251). In every selective regime there is a delicate balance between the two that will yield the maximum reproductive success. In selective regimes where food is extremely scarce, the belief-producing system should make sure that whenever there is food in the vicinity, the organism has a belief about it. In these selective regimes, high Jamesian reliability is selectively advantageous. As long as every item that looks like food is food, Cartesian reliability will be of a much lesser importance. In contrast, in selective regimes where there is plenty of food around, but also plenty of poisonous items that look very similar to food, high Cartesian reliability is what will be selectively advantageous (and Jamesian reliability is not so important). And in selective regimes where food is scarce and there is also a lot of poisonous items around, both Cartesian and Jamesian reliability will be highly significant for the organism's fitness.

The better safe than sorry argument could be thought of as a colorful exposition of scenarios where Jamesian reliability matters a lot. The jumpy mouse has higher chances to survive than the less jumpy one because in this specific selective regime having beliefs about the cat whenever there is a cat around is highly survival-enhancing. When Stich says, describing the 'better safe than sorry' strategy, that "natural selection may often favor a process that yields false beliefs most of the time, but which has a high probability of yielding true beliefs when it counts" (Stich, 1981, p. 345), he is giving an early characterization of the selective advantage of a belief-producing system with high Jamesian and low Cartesian reliability.

But in some other selective regimes the jumpy mouse will be selected against: for example, in selective regimes where running away burns a lot of energy and food is scarce. Stich assumes that correctness has to do with Cartesian reliability: a belief-producing mechanism is reliable if it produces few false beliefs – if it has high Cartesian reliability. But Godfrey Smith's analysis shows us that we have as much reason to favor Jamesian reliability: to consider a belief-producing mechanism to be reliable if it produces many true beliefs.

The bottom line is that the ambiguity of the concept of reliability makes it clear that the concept of 'representing correctly' in the way the question about whether it is selectively advantageous to represent correctly was raised is itself ambiguous between the following two questions:

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1. Is it selectively advantageous to have a belief-producing mechanism that has high Cartesian reliability?
2. Is it selectively advantageous to have a belief-producing mechanism that has high Jamesian reliability?

And the problem is that given the trade-off between Cartesian and Jamesian reliability, we can't give a positive answer to either question: sometimes (in some selective regimes) it is selectively advantageous to have a belief-producing mechanism that has high Cartesian reliability and sometimes (in some other selective regimes) it is selectively advantageous to have a belief-producing mechanism that has high Cartesian reliability. But high Cartesian reliability is not selectively advantageous across all selective regimes and neither is high Jamesian reliability.

But then under no interpretation (Cartesian or Jamesian) can we conclude that it is selectively advantageous to represent correctly. I'll argue in the next two sections that while this is true in general, this argument fails to apply in the case of some special kinds of representation, ones that are directly involved in the execution of actions.

4 | PRAGMATIC REPRESENTATIONS

Steven Stich considers the following way of resisting his argument against the selective advantage of representing correctly:

> It is not just producing more truths and fewer falsehoods that makes one system of reasoning better than another; the system must excel at producing certain kinds of truths and avoiding certain kinds of errors. This objection is surely right, as far as it goes. The problem is that it does not go far enough. It does not say *which kinds* of truths and errors are important (Stich, 1990, p. 162. ftnt. 7).

Stich concludes that there is no way of telling "which kinds of truths and errors are important" without running into circularity:

> One easy way to say which truths and errors are important is to appeal to reproductive success: the truths to get are those that enhance fitness; the errors to avoid are those that detract from fitness (Stich, 1990, p. 162. ftnt. 7).[2]

And this will clearly not be a good way of identifying those representations that matter. But Stich has not given us any reason to think that this is the only way to single out representations the correctness of which is more relevant for survival than the correctness of other representations.

My aim is to show that we can give an account of "which kinds of truths and errors are important" without running into circularity. Some kinds of representations are more relevant for our survival than others and the reliability of the mechanisms that produce these is indeed selectively advantageous.

Let us go back to the example of the organism, O, that can digest only apples and that goes about looking for red and round objects. Once O identifies an apple, by means of representing it

[2] See also Stich 1981, p. 345, where he is even more explicit: "What natural selection does favor is beliefs which yield selective advantage."

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as red and round, it now needs to actually eat it. And in order to do so, O needs to represent the apple's spatial location, otherwise it would have no idea how to approach it. And O also needs to represent the apple's size, otherwise it would have no idea what grip size is appropriate for picking it up (assuming that O has forelimbs with fingers). And O also needs to represent the apple's weight, otherwise it would have no idea how much force it should exert when lifting it. And so on. Let's call these properties, the properties the representation of which is necessary for the performance of an action 'action-properties'. I will argue that it is selectively advantageous to represent action-properties correctly.

But first, more needs to be said about these action-properties. Action-properties are relational properties that depend both on the intrinsic properties of the object and on the organism. When O represents the spatial location of the apple, it does so in an egocentric manner: in a way relative to its own spatial position. And when O represents the size of the apple, this representation is also an egocentric one: it depends, for example, on the size of O's forelimbs. And so on.

I will call the representations that attribute action-properties to objects 'pragmatic representations' (Nanay, 2013, 2014b, 2017, 2018, 2019). Others label them differently. Kent Bach calls them 'executive representations' (Bach, 1978), Myles Brand calls them 'immediate intentions' (Brand 1983), Marc Jeannerod calls them 'visuomotor representations' (Jeannerod, 1997) (for similar mental states with different labels, see Ruth Millikan's 'goal state representation' (Millikan, 2004, Chapter 16), Andy Clark's and Pete Mandik's 'action-oriented representations' (Clark, 1995; Mandik, 2005; Nanay, 2012) and Stephen Butterfill's and Corrado Sinigaglia's 'motor representations' (Butterfill & Sinigaglia, 2014; see also Brogaard, 2011a, 2011b; Brozzo, 2017; Grush, 2004; Hommel et al., 2001; Norman, 2002; Pacherie, 2011 for more).[3]

These representations are likely to be unconscious and they seem to be very different from beliefs or other propositional attitudes. If pragmatic representations represent action-properties correctly, this makes the success of the action more likely. If they misrepresent action-properties, this makes the success of the action less likely.

Pragmatic representations are both phylogenetically and ontogenetically quite basic. Animals and small children are capable of performing goal-directed actions, such as running away from predators or chasing prey. But if they are, they must be able to have pragmatic representations. Hence, even organisms that may be incapable of entertaining complex thoughts and beliefs must be able to have pragmatic representations (Nanay, 2013b, 2014a, 2014b).

My general strategy in this paper is to shift the emphasis of the selective advantage of correct representations from beliefs to pragmatic representations. I argue that it is problematic to claim that it is selectively advantageous to have a reliable belief-producing mechanism. But it is not problematic to claim that it is selectively advantageous to have a reliable pragmatic representation-producing mechanism.

We have seen that the selective advantage of representing the properties of being red and being round correctly is only uncontroversial in some idealized selective regimes – ones where all and only apples are red and round. I will argue that representing action-properties correctly, in contrast, is selectively advantageous in all selective regimes: each time O does manage to eat an apple (or, for that matter, performs any action successfully), it needs to attribute the correct action-properties to the apple. So even if the correctness of the representational capacities that help us to identify the objects one should perform an action with (eat or run away from) are not selectively advantageous, the correctness of the representational capacities that make it possible for us

[3] It has been argued (Nanay 2011, 2012, 2013a, 2013b, see also Bach 1978, esp. p. 368) that pragmatic representations are perceptual states. My argument is consistent with this proposal but it does not rely on it.

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to in fact perform any of these actions are selectively advantageous – without them we could not perform any action successfully and this would surely lead to quick extinction.

I will go through this argument more slowly in the next section. But before I do so, I would like to return to the distinction from Section I between the selective advantage of the correctness of token beliefs and the selective advantage of the reliability of belief-producing mechanisms. The same distinction applies in the case of pragmatic representations. A correct pragmatic representation does not guarantee selective advantage either. Correct pragmatic representations make the successful performance of actions more likely. But successful actions are not always fitness-enhancing. They do not always contribute to one's fitness. Take the action of drinking a cup of poison. This action, if successful, does not contribute to one's fitness. But then even if the correctness of a pragmatic representation increases the chances of the successful performance of an action, this does not guarantee that it thereby also increases the organism's fitness.

To go back to our apple-eating organism, O, while it may be true that O's correct pragmatic representations make it possible for it to eat apples successfully (and thereby remain alive), the very same correct pragmatic representations will also be the ones that help O to perform the action of eating the poisonous mushroom successfully. In short, the correctness of a token pragmatic representation is not selectively advantageous.

How about the reliability of the pragmatic representation-producing mechanism? I argue that this is where the real question lies. Suppose that you throw a hand-grenade at me and I catch it. It is my pragmatic representation that makes it possible for me to catch this hand-grenade: I attribute the correct spatial location property to the grenade that allows me to reach out in the right direction. I attribute the correct size property that allows me to form the appropriate grip-size. And so on. The correctness of my pragmatic representation is responsible for the success of my action of catching the hand-grenade. But, as a result of this successful action, I die. Representing the relevant action-properties correctly does not increase my fitness.

So far, this story is about a token correct pragmatic representation. But remember that the question was about the reliability our pragmatic representation-producing mechanisms. If my pragmatic representation-producing mechanism is reliable (I will devote the next section to clarifying what sense of reliability is in play here), it will also produce other correct pragmatic representations. And if things were a little different, it would still produce correct pragmatic representations.

Now, suppose that things are a little different. Suppose that instead of (stupidly) catching the grenade, I duck. In order to successfully duck and avoid being blown up by the hand grenade, I would also need to have a pragmatic representation that represents the relevant action-properties correctly. And as long as my pragmatic representation-producing mechanism is reliable, this pragmatic representation will also be correct. The problem with the scenario where I catch the hand-grenade is not that my pragmatic representation is incorrect, but that my pragmatic representation is connected to the wrong beliefs/desires – in a similar way to the tiger scenarios in the case of beliefs I considered in Section I.

Thus, having a reliable pragmatic representation-producing mechanism is fitness enhancing (unlike having a correct token pragmatic representation). Even in extremely hostile selective regimes where almost everything is poisonous, having a reliable pragmatic representation-producing mechanism will give an organism selective advantage as it at least has a chance to successfully eat something (and at least some of the things it can eat are not poisonous), whereas those organisms whose pragmatic representation-producing mechanism is unreliable will not be able to eat anything at all.

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While this discussion may have warded off a prima facie objection about the selective disadvantage of correct action-guiding representations by disambiguating between questions about correct representations and questions about reliable representation-producing mechanisms, this still leaves us with the real problem for any account that argues that it is selectively advantageous to represent correctly: the problem of the trade-off between Jamesian and Cartesian reliability.

5 | PRAGMATIC REPRESENTATIONS AND JAMESIAN/CARTESIAN RELIABILITY

We have seen in Section III that the real problem with the claim that it is selectively advantageous to have a reliable representation-producing mechanism is that there is a trade-off between Jamesian and Cartesian reliability. Even if a representation-producing system has high Jamesian reliability, this does not rule out very low Cartesian reliability and thus, terrible chances to survive. This happens, for example, when our apple-eating organism, O, lives in an environment with lots of red and round poisonous mushrooms. And, conversely, even if a representation-producing system has high Cartesian reliability, this does not rule out very low Jamesian reliability and thus, very low fitness, as the better safe than sorry scenarios demonstrate.

It is time to introduce a further wrinkle in this way of formulating the problem. An organism may live in an environment with lots of poisonous items around but with very dangerous predators. When it comes to representing the predators, Jamesian reliability is of the essence as the organism should not fail to represent any approaching predator. But when it comes to representing food, Cartesian reliability would be more important as this is what would prevent the organism from eating something poisonous.

In short, in the case of each feature of the environment that the organism represents there is an independent ideal trade-off between Cartesian and Jamesian reliability. In the present example, a high Cartesian/low Jamesian ratio for food and a low Cartesian/high Jamesian ratio for predators.

A high Jamesian reliability for a property, P, is consistent with low Jamesian reliability for property P*, P**, P***, where P*, P** and P*** are properties in the same property-space as P. So, to focus on colors, suppose that food is scarce in O's environment, so it should really try to eat everything that looks red (in order to not miss out on any apples in the environment). In this case, the property of being red has a very high Jamesian reliability: if something is red, O has a very strong incentive to represent it as red. If it fails to do so, it will risk starving to death (given the scarcity of food in the environment). But how about the other colors in the color property-space? They are unlikely to have high Jamesian reliability: there is no incentive for O to represent black things as black or blue things as blue as nothing that is digestible for O is ever blue or black (let's ignore predators, reproduction and all other aspects of life than eating for the sake of simplicity).

And as long as high Jamesian reliability of one property in a property-space is consistent with low Jamesian reliability of other properties in the same property-space, we will always get a trade-off between Jamesian and Cartesian reliability.

But I will argue that pragmatic representations are different. In the case of pragmatic representations, the high Jamesian reliability of an action-property in a property-space implies high Jamesian reliability of all the other action-properties in this property-space. I will argue that it follows from this that while it is true in general that high Jamesian reliability is consistent with low Cartesian reliability, and, therefore, in some selective regimes, with terrible chances to survive, it is not true for pragmatic representations.

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Remember that in the case of pragmatic representations, high Jamesian reliability means a high conditional probability of the pragmatic representation being tokened given the instantiation of an action-property: a high value for Pr (pragmatic representation | action-property).

Now suppose that the Jamesian reliability of the pragmatic representation-producing system is high. If x is at a spatial location Q, the organism represents it as such (in order to catch it or in order to run away from it). But if the Jamesian reliability of the pragmatic representation-producing system is high, then it is not only spatial location Q that will be represented with high Jamesian reliability, but also spatial location Q*, Q**, etc. There is strong incentive to localize x in one's egocentric space correctly. If there weren't then the organism would never be able to eat or mate or run away from predators. But this incentive is there not only for some of the spatial location properties in the property-space of spatial location properties. It is not only 'upwards, to the left' that needs to be correctly represented, but all other spatial location properties as well. Not only Q, but also Q*, Q**, Q***.

This is a major difference between properties like being red in the case of organism O and action-properties. In the case of properties like being red, high Jamesian reliability of this property is consistent with low Jamesian reliability of other properties in the same property-space: being black, being blue, etc. In the case of action-properties, high Jamesian reliability of an action-property implies high Jamesian reliability of all other action-properties in the same property-space.

Now we can conclude the argument and show that there is no Jamesian/Cartesian reliability trade-off for pragmatic representations. Pragmatic representations are special in the sense that if the Jamesian reliability of a pragmatic representation-producing system is high, its Cartesian reliability is also high.

This takes the form of a *reductio* argument. Suppose, for *reductio*, that it is possible that even if the Jamesian reliability of a pragmatic representation-producing system is high, its Cartesian reliability is low. Suppose that we have this pragmatic representation-producer system that has high Jamesian reliability; nonetheless, it produces lots of incorrect pragmatic representations. Take one of these incorrect pragmatic representations. It represents x as having action-property Q* and not Q – the action-property x in fact has. But then given that we assumed that the Jamesian reliability of the pragmatic representation-producing system is high and, as we have seen, it is high for all action-properties in the property-space, it follows that provided that x is Q*, the organism would need to represent it as Q*. But the supposition for *reductio* is that the organism represents it as Q – we have reached a contradiction.

To sum up, there is no trade-off between Jamesian and Cartesian reliability for pragmatic representations.[4] If Jamesian reliability if high, Cartesian reliability will also be high.

[4] I want to clarify in what sense there is no trade-off here. We have seen that in general, there is a trade-off between Jamesian and Cartesian reliability, by which I mean that given the cognitive limitations of finite organisms, if the Jamesian reliability of a representation-producing mechanism gets higher, more and more cognitive resources are needed to keep the Cartesian reliability of a representation-producing mechanism constant. These pressures for a trade-off between Jamesian and Cartesian reliability are always in place as long as the organism has finite cognitive resources, that is, in all actual biological cases. But in the case of pragmatic representations, this pressure is balanced out and even screened off by the pressure to have high Jamesian reliability for all properties in the property-space (which, as we have seen, forces the representation-producing mechanism to increase Cartesian reliability as Jamesian reliability increases. To put it briefly, in the general case, the cognitive limitations of the organism pushes the system towards more trade-off between Jamesian and Cartesian reliability. In the case of pragmatic representations, in contrast, the selective pressure for high Jamesian reliability for all the properties in the property-space pushes the system towards less trade-off between Jamesian and

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Stich's rhetoric was that what matters in evolution is not truth but action. That's very true. But as successful action is only possible if the organism has the right representations, that is, the right pragmatic representations to guide its action.

6 | CONCLUSION

The conclusion is that in a way both the proponents and the opponents of the claim that representing correctly is evolutionarily useful are right. The proponents, such as Quine, are right that representing correctly is something that must be selectively advantageous in some sense. On the other hand, the opponents are also right in claiming that having true beliefs is not selectively advantageous. I attempted to drive a wedge between these two positions by specifying those mental states the correctness of which is indeed selectively advantageous: mental states that are directly involved in bringing about actions.[5]

REFERENCES

Bach, K. (1978). 'A representational theory of action', *Philosophical Studies*, 34, 361–379.

Brand, M. (1984). *Intending and Acting*. Cambridge, MA: The MIT Press.

Brogaard, B. (2011a). Are there unconscious perceptual processes? *Consciousness and Cognition*, 20, 449–463.

Brogaard, B. (2011b). Unconscious vision for action versus conscious vision for action? *Cognitive Science*, 35, 1076–1104.

Brozzo, C. (2017). Motor intentions: How intentions and motor representations come together. *Mind & Language*, 32, 231–256.

Butterfill, S., & Sinigaglia, C. (2014). Intention and motor representation in purposive action. *Philosophy and Phenomenological Research*, 88, 119–145.

Clark, A. (1995). Moving minds: Re-thinking representation in the heat of situated action. In J., Tomberlin (ed.), Philosophical Perspectives *9: AI, Connectionism and Philosophical Psychology*. Atascadero, CA: Ridgeview, pp. 84–104.

Dennett, D. C. (1980). Reply to Professor Stich. *Philosophical Books*, 21, 73–76.

Dennett, D. C. (1981). Three kinds of intentional psychology. In: R. A. Healey (ed.): *Reduction, Time and Reality*. Cambridge: Cambridge University Press, pp. 37–62.

Dennett, D. C. (1987). *The Intentional Stance*. Cambridge, MA: The MIT Press.

Fodor, J. (1981). Three Cheers for Propositional Attitudes. In: *Fodor, Jerry:* Representations: Philosophical essays on the foundations of cognitive science. Cambridge, MA: The MIT Press. pp. 100–123.

Godfrey-Smith (1991). Signal, detection, action. *Journal of Philosophy*, 88, 709–722.

Godfrey-Smith (1996). *Complexity and the Function of Mind in Nature*. Cambridge: Cambridge University Press.

Goldman, A. (1986). *Epistemology and Cognition*, Cambridge, MA: Harvard University Press.

Goldman, A. (1992). *Liaisons: Philosophy Meets the Cognitive and Social Sciences*, Cambridge, MA: MIT Press.

Grush, R. (2004). "The Emulation Theory of Representation: Motor Control, Imagery and Perception," *Behavioral and Brain Sciences*, 27, 377–442.

Cartesian reliability. I am grateful to an anonymous referee for helping me to clarify the sense of trade-off relevant in this discussion.

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Hommel, B., Müsseler, J., Aschersleben, G., & Prinz, W. (2001). "The Theory of Event Coding: A Framework for Perception and Action Planning" *Behavioral and Brain Sciences*, 24, 849–931.
Jeannerod, M. (1997). *The Cognitive Neuroscience of Action*. Oxford: Blackwell.
Lycan, W. (1988). *Judgement and Justification*. Cambridge: Cambridge University Press.
Lycan, W. (1991). Why we should care whether our beliefs are true. *Philosophy and Phenomenological Research*, 51, 201–205.
Mandik, P. (2005). "Action Oriented Representation." In: *Cognition and the Brain: The Philosophy and Neuroscience Movement*, ed. Andrew, Brook & Kathleen, Akins 284–305. Cambridge: Cambridge University Press.
Millikan, R. G. (1984). *Language, Thought and Other Biological Categories*, Cambridge, MA: MIT Press.
Millikan, R. G. (1993). *White Queen Psychology and other Tales for Alice*, Cambridge, MA: MIT Press.
Millikan, R. (2004). *Varieties of Meaning*. Cambrdige, MA: The MIT Press.
Nanay, B. (2011). Do we see apples as edible? *Pacific Philosophical Quarterly*, 92, 305–322.
Nanay, B. (2012). Action-oriented perception. *European Journal of Philosophy*, 20, 430–446.
Nanay, B. (2013a). *Between Perception and Action*. Oxford: Oxford University Press.
Nanay, B. (2013b). Success semantics: The sequel. *Philosophical Studies*, 165, 151–165.
Nanay, B. (2014a). Naturalizing action theory. In: M. Sprevak & J. Kallestrup (eds.): *New Waves in the Philosophy of Mind*. Hampshire: Palgrave Macmillan, pp. 226–241.
Nanay, B. (2014b). Teleosemantics without etiology. *Philosophy of Science*, 81, 798–810.
Nanay, B. (2017). Comment: Every Action Is an Emotional Action. *Emotion Review*, 9: 350–352.
Nanay, B. (2018). Zoomorphism. *Erkenntnis*, 86: 171–186.
Nanay, B. (2019). Entity Realism About Mental Representations. *Erkenntnis*, 87: 75–91.
Norman, J. (2002). "Two Visual Systems and Two Theories of Perception." *Behavioral and Brain Sciences*, 25, 73–144.
Nozick, R. (1993). *The Nature of Rationality*. Princeton: Princeton University Press.
Pacherie, E. (2011). "Nonconceptual representations for action and the limits of intentional control." *Social Psychology*, 42, 67–73.
Papineau, D. (1987). *Reality and Representation*, Oxford: Blackwell.
Papineau, D. (1993). *Philosophical Naturalism*, Oxford–Cambridge, MA: Blackwell.
Plantinga, A. (1993). *Warrant and Proper Function*. Oxford: Oxford University Press.
Quine, W. (1969). *Ontological Relativity and Other Essays*. New York: Columbia University Press.
Searle, J. (1983). *PPR Does Absolutely No Copy-Editing Whatsoever*. Cambridge: Cambridge University Press.
Sober, E., The Adaptive Advantage of Learning and A Priori Prejudice. In: Sober, E. (1994). *From a Biological Point of View*. Cambridge: Cambridge University Press, pp. 50–69.
Stephens, C. (2001). When is it selectively advantageous to have true beliefs? *Philosophical Studies*, 105, 161–189.
Stich, S. (1981). Dennett on Intentional Systems. *Philosophical Topics*, 12, 39–62, reprinted in W. G. Lycan & J. J. Prinz (eds.): Mind and Cognition. Oxford: Blackwell, pp. 337–350.
Stich, S. (1985). Could man be an irrational animal? *Synthese*, 64: 115–135.
Stich, S. (1990). *The Fragmentation of Reason*. Cambridge, MA: The MIT Press.

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