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THE HARD PROBLEM OF CONTENT: SOLVED (LONG AGO)

Abstract. In this paper, I argue that even if the Hard Problem of Content, as identified by Hutto and Myin, is important, it was already solved in naturalized semantics, and satisfactory solutions to the problem do not rely merely on the notion of information as covariance. I point out that Hutto and Myin have double standards for linguistic and mental representation, which leads to a peculiar inconsistency. Were they to apply the same standards to basic and linguistic minds, they would either have to embrace representationalism or turn to semantic nihilism, which is, as I argue, an unstable and unattractive position. Hence, I conclude, their book does not offer an alternative to representationalism. At the same time, it reminds us that representational talk in cognitive science cannot be taken for granted and that information is different from mental representation. Although this claim is not new, Hutto and Myin defend it forcefully and elegantly.

Keywords: representation, Hard Problem of Content, satisfaction conditions, information

Is cognitive science viable without appealing to notions such as truth or veridicality? The recent flurry of antirepresentational manifestos suggests that it is; antirepresentationalists claim that there can be cognitive science without content that has satisfaction conditions, at least for a large range of cognitive phenomena. One such manifesto can be found in Hutto & Myin (2013). But dissatisfaction with contentful representations runs deep. Even Fodor and Pylyshyn talk about minds without meanings, claiming that the only semantic property of representations is reference (Fodor & Pylyshyn, 2015).

However, global antirepresentationalism is obviously untenable; it is equivalent to semantic nihilism, which states that nothing ever is true or false, or veridical. Of course, then, semantic nihilism cannot be true, for if it is true, it simply has no truth-value, and some semantic nihilists seem to embrace naïve antirealism and claim that nothing ever is true or false. Hutto and Myin are not *that* radical, though. The question is: How rad-

ical are they, really? My answer is that even if they seem to be radical, their position is awkwardly inconsistent and that their main argument is old news. Moreover, the main problem for representationalism, which they call "The Hard Problem of Content", has already been solved. In fact, it was solved several dozen years ago—the book is curiously out of date with current naturalized semantics.

The structure of the paper is as follows. In the first section, I will argue that because we know that naïve semantic nihilism is untenable, we are justified in saying that there should be a viable notion of satisfaction conditions. Then I show that even if the Hard Problem of Content is important, Hutto and Myin are confused to think that all its solutions rely on the notion of information as covariance. There is more to the notion of natural information than covariance, and teleosemantic accounts of representation do not rely merely on covariance. Indeed, the Hard Problem of Content was solved a couple of dozen years ago. I conclude by pointing out that, for the sake of consistency, Hutto and Myin should apply the same standards to basic and linguistic minds. But if they do, they will either have to embrace representationalism or turn to semantic nihilism. Hence, I conclude, their book does not offer an alternative to representationalism. At the same time, it reminds us that representational talk in cognitive science cannot be taken for granted and that information is different from mental representation. Although this claim is not new, Hutto and Myin defend it forcefully and elegantly.

1. The Lessons of Semantic Nihilism

Naïve semantic nihilism is not a philosophical position that deserves a serious debate because it would imply that expressing any position, including semantic nihilism, is pointless. Although there might still be defenders of such a position, it undermines the very idea of a philosophical debate, as long as the debate is supposed to be based on rational argumentation. In rational argumentation, one is forced to accept a sound argument, and soundness implies the truth of the premises and the validity of the argument. Just because these are universal standards for any rational debate, undermining the notion of truth can be detrimental; there would be no way of deciding between opposing positions besides rhetoric. Hence, it is a minimal requirement for rational argumentation in philosophy; one has to assume that one's statements can be truth-bearers. If they cannot have any truth-value, then it's no longer philosophy.

Of course, one could argue that all debate is reducible to rhetorical tricks, and appeal to a Nietzschean vision of philosophy, but that simply is not the standard that most philosophers, and science in general, accept. I don't think the self-refutation of semantic nihilism would persuade a Nietzschean thinker at all, as some kinds of philosophy arguably avoid the appeal to truth, and turn philosophy into a kind of literature. Yet if philosophy is just a kind of literature, as Richard Rorty (1989) claims, it makes little sense to read most of it, as it's stunningly boring, painful to understand, and dull. Homer is much more fun to read than Plato, and Stieg Larsson definitely aesthetically more rewarding than Heidegger. But still, one may refuse to engage in philosophical debate and, say, play the flute or write poems instead; but if arguments and reasons count, then it has to be assumed that there are truth-bearers and satisfaction conditions. And sophisticated global antirealism has yet to be invented, if it is supposed to be plausible in a philosophical debate.

Closer to home, semantic nihilism is implicitly denied by all participants of the recent debate over representation. But if this is so, then global antirepresentationalism (or naïve antirealism about everything) cannot be a stable position, and appeals to Ockham's razor are unsuccessful when semantic properties as such are concerned. Parsimony considerations would speak for semantic nihilism; after all, an ontology that does not include semantic properties is more parsimonious. But such an ontology is useless for any serious philosophy. This pertains also to naturalistic philosophy. If there is no naturalistic account of truth or truth-bearers in a naturalistic philosophy, so much the worse for such philosophy, not for truth. In other words, even if we have no account of truth, we need to assume that one is possible.

The dialectic of the debate is such that antirepresentationalism has to make an important concession: there cannot be a general argument against all forms of representation. This is why successful antirepresentational arguments are not systematic (Kirchhoff, 2011): there is no general theory of antirepresentationalism that would embrace naïve semantic nihilism. At best, such an argument against representations can rest on a pessimistic induction, but with an important limitation—arguing against meaningful linguistic representations leads to an unstable position. This is precisely why Hutto and Myin are not so radical as to argue against all representations. But this also means that their antirepresentational points are inapplicable to natural language. Indeed, this is what they explicitly claim. However, their Hard Problem of Content is equally hard when it comes to cognitive representations as when it comes to language. The account of sat-

isfaction conditions is equally difficult for mental content as for linguistic content, and there is no reason to give a special proviso for language in their radical enactivism (Harvey, 2015). Yet, at the same time, I think one cannot seriously embrace semantic nihilism, which is sometimes implied by Harvey in his criticism of Hutto and Myin. Elsewhere I have already argued that there is a successful account of satisfaction conditions for mental contents (Miłkowski, 2015b). Here, I will show that the Hard Problem of Content can be easily solved when one does not assume that information-as-covariance constitutes content, and that it has indeed been solved. I will also show that there are other notions of information, summarily ignored by Hutto and Myin in their discussion—in particular control information and information-as-structural-similarity.

2. The Hard Problem of Content and Information

Hutto and Myin never take care to define the Hard Problem of Content explicitly in their book, but it seems that what they have in mind is the difficulty of positing informational content compatible with explanatory naturalism (Hutto & Myin, 2013, p. xv). Informational content has satisfaction conditions—it can be satisfied; i.e., be true or false, be veridical or not, etc. However, as they claim, the *only* naturalistic notion of information is the one based on covariance. And because covariance doesn't constitute content the problem is hard: There is no naturalistic notion of information that might fit the bill. Semantic information, called "information-as-content" by Hutto and Myin, simply is not the same as "information-as-covariance":

> Naturalistic theories with explanatory ambitions cannot simply help themselves to the notion of information-as-content, since that would be to presuppose rather than explain the existence of semantic or contentful properties. (Hutto & Myin, 2013, p. 67)

One thing that strikes a philosopher of science in this statement is the generic notion of "explanatory ambitions". Nowhere in the book are Hutto and Myin clear about what they mean by "explanation". The "naturalistic theories" in the above passage cannot refer simply to scientific theories, as all scientific theories are *eo ipso* naturalistic; so they probably mean naturalistic theories in philosophy. But it's slightly unclear what is meant here. Do they simply mean explanatory naturalism, which presupposes that all genuine explanations are compatible with methodological naturalism? Or

do they think that philosophy is poised to offer explanations for empirical phenomena? This would be fairly surprising, as they do not report any experiments or empirical evidence even in the broadest sense.

Do they embrace the argument model of Hempel and Oppenheim (1948)? If that is so, they would have to presuppose that there are universal laws in cognitive science that are used for explanation jointly with initial conditions to infer the statements about observed (or predicted) states of affairs. Maybe they only believe in invariant generalizations in cognitive science (Woodward, 2001)? Or maybe they think that the notion of function is the core of cognitive explanations (Millikan, 1986)? Whatever they assume, they fail to analyze any explanations that rely on the notion of content with satisfaction conditions. One may charitably assume that they probably mean that the notion of content cannot be presupposed in explanations of satisfaction conditions. This is undeniably true; the explanandum should be elucidated in a fashion that is methodologically naturalistic for the explanation to be explanatorily naturalistic. Yet this is not true for explanations that appeal to the notion of content in their explanantia. Let me elaborate.

Explanations are not supposed to explain everything in one blow, one possible exception being the alleged theory of everything in fundamental physics (but even such an explanation would presuppose mathematics rather than explaining it). Given the dialectic of the debate over content, as introduced in the previous section, one may presuppose that there are true and false statements; and that means that one may also presuppose that there is a naturalistic account of them, even if one is not ready to defend one. Similarly, one need not explain what the objective measurement is in any empirical explanation that relates to experimental measurements. They may be safely assumed, as they belong to basic notions in science, and Hutto and Myin supposedly talk of scientific explanations when they mention "explanatory ambitions". For this reason, they are wrong about the burden of proof in the debate; representationalists need not prove that the notion of representation is explanatorily naturalistic if they only use the notion to explain other phenomena. This does not mean that we don't need a naturalistic account of representation; it is just to say that explanatory ambitions do not always commit cognitive scientists to defend any naturalized semantics at all even if they use representational explanations. In other words, they may safely assume that the Hard Problem of Content is solved (and, indeed, it is).

Let me return to the main argument in the book. The argument assumes that the only naturalistic notion of information is information-as-covariance;

and Hutto and Myin introduce it with a generic definition "s's being F 'carries information about' t's being H iff the occurrence of these states of affairs covary lawfully, or reliably enough" (Hutto & Myin, 2013, p. 66).

I am not going to argue that covariance constitutes content. It does *not*. Obviously, covariance is a relation that has completely different characteristics than the relation of representing. For example, covariance is necessarily symmetrical and reflexive, while representing need not be. This much is sufficient to show that one cannot reduce representing to covarying.

But Hutto and Myin are wrong in thinking that most theorists of naturalized semantics believe that covariance constitutes content. They do not. Of course, it is true that the talk of codes in cognitive science is prevalent, and that coding does not constitute content. This has been argued by Mark Bickhard for dozens of years (Bickhard & Richie, 1983; Bickhard, 1993, 2008; Campbell, 2011): there are encodings, such as Morse Code, but they cannot explicate the notion of content. But even if the code (or covariance) assumption can be found in many foundational texts in cognitive science (for example in the notion of semantic transduction used by Pylyshyn, 1984), it does not mean that there has been no progress since then.

Moreover, non-semantic information has more flavors that are formally quite distinct from information-as-covariance. Before I show how the Hard Problem has been already solved by Dretske (and Millikan, and Fodor, and Bickhard, by the way), it's important to note that mere property covariance does not suffice to describe certain informational relationships. One of these is information-as-structural-similarity.

Let me clarify why this is important. It was Kenneth Craik who proposed, in his pioneering work from 1943, that the main function of thought is to model reality in much the same way as the mechanical devices used to aid in calculation (Craik, 1967, p. 57). To model reality, thought needs to parallel reality mechanically in the brain. Since then, this idea has been embraced, elaborated, and developed by representationalists who stress that there is an important difference between describing or modeling reality and simply indicating a single property. Many have claimed that there is a crucial difference between simple property covariance and structured property covariance; the latter is usually framed in terms of isomorphism or homomorphism (Bartels, 2006), or to be more exact—structural similarity. The latter, however, ever since Goodman (1951), has had bad philosophical press. It's a well-known fact that the raven can be thought to be similar to a writing desk (Carroll, 1900); anything can be shown to be similar to anything else, unless the relata of the similarity relation are fixed before checking whether the relation obtains. Yet when the re-

lata are fixed, there are several satisfactory accounts of similarity that can serve as the basis of information-as-structural-similarity (Decock & Douven, 2010).[1]

One of the formally correct and influential accounts of similarity is Tversky's (1977) contrast account. This account is psychologically realistic but can be applied to judge, for example, the similarity of scientific models to reality (Weisberg, 2013). Note that the psychologically realistic notion of similarity does not involve a symmetrical relationship. For example, human subjects judge North Korea to be more similar to China than China to North Korea. There are several formal models of psychological similarity, but Tversky's set-theoretic version remains one of the simplest to understand, so I will restrict myself to it. Moreover, Tversky's contrast account of similarity is not reducible to covariance, which will illustrate my point that covariance is different from similarity, at least in its psychologically credible flavor.

The important point is that, for two entities that are assessed as similar, there will be features that they share and ones that they don't share; and the features they don't share do not covary (as they are absent). One cannot easily account for the contrast between similar entities using covariance between non-occurrent properties. Even if there is some covariance of properties of two objects, it is therefore not enough for psychologically plausible similarity judgments: covariance is symmetric and psychological similarity antisymmetric.

Why is this important? For one thing, William Ramsey has recently argued that mere covariance is not enough for representation; he also requires that there be an additional relationship of similarity between structured properties (Ramsey, 2007). For another, although structured similarity implies covariance between shared features of some (structured) entities, and covariant features are trivially similar to one another, these are two formally different relationships. They also involve different logical depth (or the amount of structural information, measured in *logons*, or numbers of degree of freedom). And most importantly, the informational structures that are neither trivially simple nor extremely complex have distinct cognitive roles, for example in surrogative reasoning (Swoyer, 1991). Surrogative reasoning allows one to reason about relatively complex properties in the world without any direct sensing of such properties. In other words, they are detachable from their referents and can be used in representation-hungry problems (Clark & Toribio, 1994). For this reason, some view representations based on structured similarity as paradigmatic cases of cognitive representation (Cummins & Roth, 2012).

So while it is true that structured similarity implies covariance, and covariance implies structured similarity, it does not follow that vehicles that are in a structured similarity relationship with their reference have the same amount of structural information as vehicles that merely covary. The additional logical depth of contrast-based structured similarity stems from its antisymmetric nature. But most importantly, structured similarity is at the core of the capacity to model the referents of structured representations. This feature of representation has been acknowledged by virtually all proponents of naturalized semantics (except Fodor with his reliance on the claim that there is no meaning), and it remains a blind spot in Hutto and Myin's analysis.

However, there is another blind spot, which is even more important. The relationships of covariance, iso- or homomorphism, or similarity require one to fix the candidate relata before assessing whether the relationship obtains or not. This is one of the important problems for structuralism in any domain, and has been repeatedly discovered by many, at least since Newman's proof that Russell's account of perception is trivial (Newman, 1928). One of the ways to fix relata is to look at how information works in a system; entities or properties that do not have any influence on the system that is supposed to exploit the information should not be taken into consideration. Hence, one has first to look at how information impacts the activity of a physical system. The mere structure of the vehicle of information, be it simple or complex, is not enough to determine the meaningfulness of this information; even more, it is not enough to determine the mathematical amount of information. It is because the structural information—the number of distinctions, or physical degrees of freedom—that can be exploited depends on the system in which a given vehicle is operated upon.

Hence, to see how information works, or how representation parallels reality for a physical system, one needs to account also for the operation of the users of models. And this is exactly what was proposed by another pioneer of cybernetics, Donald M. MacKay, who analyzed the way information controls the behavior of machines and people (and belonged, with Kenneth Craik, Alan Turing and W. Ross Ashby, to the Ratio Club). *Control information* (to use the term coined by Sloman, 2010) remains the core of contemporary action-oriented accounts of representation. (MacKay himself used the term *semantic information* to refer to it, but quite differently than his followers. I will use Sloman's term here.)

MacKay (1969) analyzes the meaning of a message in terms of its effects on the receiver.[2] Suppose I acquire some information which makes some difference to me:

> Fundamentally it implies that in some circumstance or other my *expectations* will be different. I am now conditionally *ready to react differently.* The reactions potentially affected may be internal or external. They may themselves take the form of choices from among a number of possible later states of readiness to react, choices which will now be different as a result of my gaining information. It is the hierarchy of such readinesses-my total state of readiness for adaptive or goal-directed activity-which changes when I gain information. (MacKay, 1969, p. 60)

For this reason, the meaning of the message for the receiver *cannot* be captured fully in propositional content (MacKay, 1969, p. 73). Now, suppose a receiver has a vehicle with just one physical degree of freedom, and it only affects a single choice of the receiver, and one that has no further consequences. In such a case, this vehicle would be trivially simple. But the same vehicle may be used in a way that operates on a whole ensemble of other choices; and for this reason, the operational effect of the information would be complex. For example, I might see a lamp that turns off to signal that my stereo has been turned off. The lamp can take just two states; it can be on or off. But because there are multiple other choices I can make, including the choices in my further reasoning, the lamp has a rich effect on me.

Contrast this with a modern computer display. It has thousands of possible degrees of freedom. But it makes no difference to a blind person (without a screen reader); it also makes little difference to a person with impaired vision or to a hallucinator. Notably, when it displays a string of letters, it makes little difference to an illiterate person. Hence, to understand the causal influence of vehicles of information (analyzed by Dretske, 1988, in terms of *structured causation*), one needs to understand the operational structure of the receiver. To illustrate this point, one may imagine a single point in a space. The presence or absence of the point corresponds to a single physical degree of freedom. But when projected on a two-dimensional space in a receiver, it may affect the operation of the receiver in two dimensions. Depending on the dimensionality of the space the receiver uses, the point will have more or less control information.

These caveats apart, supporters of modeling accounts of representation are mostly right in claiming that simple representations are quite different from complex models. Simple representations are poised to have much more complex effects in cognitive systems. Similarity-based representations are usually created by reliable processes that are supposed to track some features of targets and abstract away from other features; but they also may and usually have more control information, as they can influence the

receivers—in this case, simply, the cognitive systems that contain the mental representations.

However, neither information-as-covariance, nor information-as-structured-similarity, nor control information constitute content. Besides the crudest version of the causal account of reference—Fodor (1992) half-jokingly attributes it to B. F. Skinner—no current account in naturalized semantics actually claims that content is constituted merely by a tracking (causation or covariation), similarity, or control relation. While Hutto and Myin are not alone in this mistaken criticism (see, for example, Mendelovici, 2012), it is important to understand why content is *not* constituted by tracking, similarity, or control. If a relation (in a strict logical sense) between the vehicle and the representation's target constituted content, then false content would have been impossible. This has been known at least since Brentano (1900). Relations obtain only when their relata exist, and in the case of intentionality, the targets, or what the representation is about, might not exist. Brentano, in his early theory, posited non-existent objects as relata but later criticized such theory vehemently (Chrudzimski, 1999). Ever since Brentano, there has been a major split in theories of intentionality. The first group of accounts claimed that intentionality is not a relation, but a pseudo-relation. The second group took intentionality to be a relation and tried to explain misrepresentation and falsehood in terms of non-existent objects, purely intentional objects, abnormal conditions of representing, and the such. Interestingly, it is the tradition closer to the solution offered by Hutto and Myin. Their teleosemiotics is exactly a new name for this old idea: dispose with content, and frame intentionality in terms of physical contact (or covariance).

However, Dretske, Millikan, Fodor, Cummins, Bickhard, and other proponents of naturalized semantics do not treat intentionality as a relation in the standard, logical sense. For this reason, in their accounts, intentionality is not reduced to tracking or similarity relationships. Intentionality is not information. First of all, were intentionality reduced to information, the well-known problem of impossibility of falsehoods would reappear. In addition, which is also crucially important, not all tracking, similarity, or control relationships constitute mental representations. They are necessary but not *sufficient* for representation. For Dretske and Millikan, another crucial factor of content determination is teleological function; for Fodor, an important role is assigned to counterfactual considerations.

Take visual hallucination as an example. Briefly, according to Dretske's account, a certain activation of neurons in the visual pathway has the function of indicating the properties of the perceived scene. In the case of biolog-

ical dysfunction (like in people with visual impairment), the visual system may still seem to indicate bizarre figures while there is nothing in the visual field that corresponds to them. But then of course there is no real indication; the system uses the visual pathway *as though* it was indicating visual properties. The content is not determined by mere indication but by a *function* of indication. A similar story can be spelled out in modal terms (as Fodor would insist): the hallucination is asymmetrically dependent on the lawful relationship occurring between the representation vehicle and the target. The content is not determined by the relationship itself but by a counterfactual regarding of the relationship.

One fact that is frequently missed in polemics against teleofunctional theories of content is that indication is for Dretske a basic form of predication (and Hutto and Myin, in their definition of information-as-covariance, follow Dretske). Let's see how Dretske defines functional meaning (meaning$_{\mathrm{f}}$):

($\mathrm{M_f}$) *d*'s being G means$_{\mathrm{f}}$ that w is F = *d*'s function is to indicate the condition of w, and the way it performs this function is, in part, by indicating that w is F by its (*d*'s) being G. (Dretske, 1986, p. 22)

Notice that indication in this sense is *truth-functional*; a property F is ascribed to w, and this can be spelled out in basic logical terms as ascribing a predicate to a subject. Hence, indication *has* satisfaction conditions. At the same time, indication cannot be false; it cannot fail to indicate that w is F. To make falsehood of representation possible, Dretske makes it asymmetrically dependent on truth by introducing the notion of function. The entity d has the function of indicating that w is F, but as soon as it malfunctions, the indication is false. Yet the content is not lost; if it were an indicator, it would truly indicate that w is F. But it only has a function of indication, and it fails to perform the function; hence it is not the case that it indicates that w is F. Any user (or consumer) of d that would take it to be an indicator would be in error by taking its property or state G to indicate that w is F.

There might be various problems with Dretske's account of content—to mention only that his early account of function as related to basic biological needs is imprecise, that he fails to link content with agency (and control), and that indication is taken to be a strictly necessary relationship (Bielecka, 2014)—but it solves the Hard Problem of Content at least in principle. The satisfaction conditions are determined by the indication relation *cum* teleological function, and there is *nothing* non-naturalistic about

the account. While various accounts of naturalized semantics differ in many regards, they usually recruit a similar solution. What is particularly interesting, the solution does not treat truth and falsehood symmetrically; falsehood is dependent on truth but not vice versa. And for Millikan and Bickhard, information-as-covariance is *not* the starting point; it appears because the cognitive system uses its representations systematically in its environment, not vice versa (see Millikan, 2007, for a longer discussion of this important point).

The move made by functional theories of content is quite similar to the one recommended by MacKay; he insisted that meaning, framed in his operational terms of modification of readiness to act, is coupled in an information-processing system with its evaluation subsystems (MacKay, 1969, p. 67). The systems whose operation depends on the information should evaluate it to make sure that it controls their operation in a proper way. MacKay however did not notice that this requires an account of the normativity of content, which is implied by "proper operation" of the content-driven system. The accounts of content based on the biological notion of function solve this problem one way or another (Miłkowski, 2015a). This is true also of some brands of representational enactivism.

For example, the interactivist model (Bickhard, 2008; Campbell, 2011), which also assumes, just like Hutto and Myin, that encodings are not sufficient for representation, does not exorcise information relationships – such as the ones constituted by causation, correlation, similarity, or control. They are recruited for action, and they're used to build indications of possible actions (roughly *affordances* in Gibson's, 1977, terminology; for a defense of the claim that affordances are representational, see Bickhard & Richie, 1983). These indications have implicit content that such-and-such action would be successful in such-and-such circumstances.[3] This means that the most basic representations have satisfaction conditions because they are related to the success of actions that they implicitly rely on.

Let me sum up. The Hard Problem of Content is not at all hard anymore. It has been solved repeatedly. Even if Hutto and Myin are right that information-as-covariance does not constitute content, this does not mean that there is no role for information in theories of representation. I insist that the account of satisfaction conditions naturally relies on control information, which, in turn, is not reducible to information-as-covariance. Richly structured vehicles of information that are produced by reliable processes selected for tracking some properties may have both causal influence on the operation of information-processing systems *and* satisfaction conditions, as long as they function as control information and are appropriately evaluated.

3. A Dilemma for Radical Enactivism

The commentators have already noticed a peculiar inconsistency in radical enactivism. It has double standards for mental and linguistic representation (Harvey, 2015). Hutto and Myin claim that basic minds have no need for content with satisfaction conditions. The notion of the *basic mind* remains undefined and it's probably just a metaphorical term for a cognitive process that does not rely on any linguistic processing. (Otherwise, one could suppose that propositional content controls my motor skills when I ride my bike, as some analytic philosophers have suggested; cf. Stanley, 2011. I doubt that Hutto and Myin would endorse Stanley's analysis.)

But the account of satisfaction conditions for natural languages is in no better position than the account of satisfaction conditions for mental content. While there is a well-known formal definition of truth for *formalized* languages (Tarski, 1933), Tarski has repeatedly stressed that it does not work for natural languages at all, as these languages do not conform to methodological strictures of logic (White & Tarski, 1987). There have been some attempts to use Tarski's ideas directly in work on the semantics of natural languages (Davidson, 1984; Field, 1972), but there is no worked-out definition of truth for any natural language that would satisfy Tarski's standards. Of course, one need not despair, but prospects for a rapid development of such a formal, comprehensive account are rather dim.

At the same time, we know that for any simple example statement in English, we can readily formulate appropriate Tarskian T-equivalences. In this respect, the situation is exactly the same as with mental representations: we don't have a comprehensive account of mental representations in any natural mind, but we can sketch accounts of truth—or veridicality—conditions for most simple examples. As Tyler Burge (2010) argues, most current work in models of early vision, which is probably the most advanced part of perceptual psychology, assumes veridicality as one of the crucial properties of representations, and can give partial accounts of how veridicality is established by some organisms.

Notice also that because of the dialectics of the debate, one is free to assume that true statements and, by the same token, truth-conditions do exist. And since the semantics of natural languages is in no better shape than the naturalized semantics of mental representation, we should be equally free to assume that satisfaction conditions exist for mental representation. Language should not be given any special treatment, so for consistency, Hutto and Myin should insist on representationalism, unless they want to embrace semantic nihilism.

So the dilemma for radical enactivism is either be consistent and drop radicalism, or be consistent and *really* radical, by endorsing semantic nihilism. The dilemma suggests that radical enactivism is not a stable position, since it makes a special exception for language, probably just to avoid semantic nihilism, which is not particularly interesting to serious thinkers such as Hutto and Myin. Because unstable positions aren't terribly attractive, no wonder that Hutto and Myin's attempt to overthrow representationalism has met with considerable opposition. However, the debate sparked by their book is immensely important, as is their insistence that information-as-covariance is not enough to establish the existence of mental representations. Obviously, it is not sufficient; it's just a fallible heuristic, and researchers in cognitive science should be aware of this.

To sum up, radical enactivism is an unstable position and not a viable alternative to representationalism in cognitive science. While representationalism can be good or bad, and Hutto and Myin are right in arguing that one should not posit representations too quickly, their enthusiasm for disposing with the notion of satisfaction conditions for mental contents is simply premature.

NOTES

[1] This means that there are several (or even several dozen) slightly different formal definitions of information-as-structural-similarity. This is not important for my purposes here, so I will not elaborate on the differences among them.

[2] A similar account of the meaning of symbols in terms of constraining has been proposed by Pattee (1972). The intuition behind these two proposals seems to be exactly the same.

[3] For this reason, affordances imply a basic form of predication. Notice that they are control information, so they are not reducible to their propositional content, but they still implicitly have propositional content.

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