

Embodied cognition and temporally extended agency

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Abstract

According to radical versions of embodied cognition, human cognition and agency should be explained without the ascription of representational mental states. According to a standard reply, accounts of embodied cognition can explain only instances of cognition and agency that are not “representation-hungry”. Two main types of such representation-hungry phenomena have been discussed: cognition about “the absent” and about “the abstract”. Proponents of representationalism have maintained that a satisfactory account of such phenomena requires the ascription of mental representations. Opponents have denied this. I will argue that there is another important representation-hungry phenomenon that has been overlooked in this debate: temporally extended planning agency. In particular, I will argue that it is very difficult to see how planning agency can be explained without the ascription of mental representations, even if we grant, for the sake of argument, that cognition about the absent and abstract can. We will see that this is a serious challenge for the radical as well as the more modest anti-representationalist versions of embodied cognition, and we will see that modest anti-representationalism is an unstable position.

1. Introduction

According to traditional and mainstream views in the philosophy of mind and cognitive science, the explanation of human cognition and agency requires the ascription of mental representations. More recently, this standard view has come under sustained attack from proponents of alternative accounts in terms of embodied cognition. Broadly speaking, we can distinguish between two main strands of this challenge. According to a radical version, human cognition and agency should be explained without any reference to mental representations. According to a more modest version, only the explanation of certain higher kinds of cognition and agency requires the ascription of mental representations—the bulk of human behavior can and should be explained as embodied cognition and without the ascription of representational mental states. In the debate on this, two standard responses have emerged. According to the first, instances of embodied cognition and agency can be explained just as well in terms of representational entities and mechanisms that are operative at sub-personal levels. This response addresses the modest and the radical version of the challenge. But it establishes only a stand-off, as it proposes only alternative representationalist explanations of embodied cognition and agency. The second reply addresses first and foremost the radical challenge. It says, in broad outline, that this challenge fails, because it is based on examples of embodied cognition and agency that are not sufficiently “representation-hungry” (Clark & Toribio 1994). For the most part, our focus will be on this second reply. But we will see that there is a representation-hungry phenomenon that raises a serious challenge for both the radical *and* the

more modest anti-representationalist versions of embodied cognition, and we will see, moreover, that modest anti-representationalism is an unstable position.

Two main types of representation-hungry phenomena have been discussed: cognition about “the absent” and cognition about “the abstract”. In the debate on this, it has been assumed that anti-representationalists can avoid the counterchallenge from representation-hunger if they can show that cognition about the absent and the abstract are not representation-hungry after all. I will argue that this assumption is mistaken, because there is another important representation-hungry phenomenon that has been overlooked—namely, our ability to engage in planning agency. First, I will show that planning agency cannot be reduced to cognition about the absent and abstract. Then I will show that it is very difficult to see how anti-representationalist versions of embodied cognition can explain planning agency, even if we grant, for the sake of argument, that they can explain cognition about the absent and abstract. I will argue, in other words, that planning agency is representation-hungry, even under the assumption that cognition about the absent and the abstract are not.

2. Representationalism

Representationalism is the traditional and, still, mainstream view in the philosophy of mind and cognitive science. It says, very roughly, that the explanation of human cognition and agency requires the ascription of mental representations.¹ There is no generally agreed account of the nature of mental representation. For our purposes, it will suffice to work with the following minimal characterization. A mental representation is presumed to be an agent-internal “stand in”: an internal state or process that is about something and that has the potential to initiate and guide the agent’s interactions with the world (Haugeland 1991, Clark & Toribio 1994, Markman & Dietrich 2000, for instance). This is not meant to be a definition in any strict sense. Most obviously, this characterization appeals to the notion of “aboutness”, which is as much in need of explanation as the notion of mental representation itself.² But it

¹ This formulation is sufficiently general and precise in order to set the scene, as it were. According to a more general version, all instances of cognition and agency, including *non*-human cognition and agency, are to be explained in terms of mental representations. According to a less general version, *core* cases of human cognition and agency are to be explained in terms of mental representations.

² There is an alternative minimal characterization, according to which mental representations are agent-internal physical states that are the vehicles of content. There is no apparent advantage in appealing to content, as opposed to aboutness, as those two notions are very closely related and as they are both as much in need of

does capture the basic idea, and it is generally agreed that this minimal characterization is substantial enough in order to open a genuine debate on the question of whether or not we need to evoke mental representations in the explanation of human cognition and agency. Further, it is generally held that there are two main types of mental representations: belief-like states and desire-like states. The former represent the world to be a certain way. The latter represent goals or how the world is to be. This distinction helps to elucidate the notion of a “stand in”, as belief-like and desire-like states appear to have the potential to stand in for things that are not present in the agent’s current environment.

3. Embodied cognition and anti-representationalism

Over the past few decades, various alternatives to representationalism have emerged. It is now common to refer to them collectively as approaches in “4E cognition”, as they tend to emphasize the embodied, enactive, embedded, and extended nature of cognition and agency (Menary 2010, for instance). There are, by now, many different views that fall under this 4E approach. We do not need to concern ourselves in detail with the differences between those positions, but a few clarifications are in order. First of all, not all proponents of 4E cognition are anti-representationalists. Most, in fact, are committed to some form of representationalism, and they argue usually only that traditional *accounts* of mental representation need to be revised or replaced. Arguably, the notion of embodiment is at the core of the 4E approach. Embodiment does not entail the other three notions. But, in the actual world, embodied minds are always *embedded* in an environment with which they interact by *enacting* their embodied skills and dispositions. This embodied interaction is often “scaffolded” by the use of external “props” and through participation in conventional and social practices. And this, in turn, fuels many of the claims and speculations about the *extended* mind. In what follows, I will use “embodied cognition” as an umbrella term for views that offer or seek alternative non-traditional accounts of human cognition and agency, and our focus will be on anti-representationalist versions of this approach.

What motivates embodied cognition, and what motivates anti-representationalism? Some versions of embodied cognition are inspired by the phenomenological works of Husserl, Heidegger, and Merleau-Ponty (Dreyfus 1991, 2002a, for instance). Some are motivated by and based on more recent developments in robotics (Brooks 1991) and

explanation as the notion of mental representation itself. Some may prefer the formulation in terms of an internal stand in, as opposed to a physical vehicle, because it avoids the explicit commitment to physicalism.

dynamical systems theory (Beer 1995, van Gelder 1995, Chemero 2009, Silberstein & Chemero 2011). Common to all is the focus on our skillful and “online” engagement with the world: the ability to engage with others and with one’s circumstances by responding to the demands of the situation in a skillful and often effortless manner, without conscious deliberation, reasoning, or planning—often called “skilled coping”. Examples from phenomenological reflection on human agency include habitual actions, such as the actions that one performs while driving a car, and cases where the agent is engaged in a responsive flow of interaction, such as in jazz improvisation or in verbal exchanges. Examples from robotics and dynamical systems theory include the ability to navigate through novel environments and the coordination of limb movements. (We will turn to dynamical systems theory in section 6.5.)

Anti-representationalists argue that such cases of skilled coping raise a challenge for representationalism. It seems that the explanation of skilled coping in terms of mental representations would be both costly and clumsy. It would, that is, impose very high demands on the agent’s information-processing resources and it would lead to an inelegant and implausible overpopulation of highly specific mental representations (to explain the initiation and guidance of complex bodily movements). Further, it seems that the explanation of skilled coping does not require the ascription of representational mental states, because it can be explained in terms of behavioral dispositions and direct guidance by the relevant features of the situation (more on this in section 6.1 and 6.3). Taken together, those points motivate the modest challenge to representationalism mentioned above. According to this *modest* anti-representationalism, a significant portion of human cognition and agency is best explained without the ascription of mental representations (Lakoff & Johnson 1980, Dreyfus 1991, 2002a, Gallagher 2005, for instance). Some go further and hold that we will, eventually, be able to explain all kinds of cognition and agency without the ascription of mental representations. Furthermore, anti-representationalists often maintain that current accounts of mental representation are untenable or, at least, controversial, and that there is no obvious reason to think that there will ever be a generally accepted account of mental representation. This leads us to the mentioned radical challenge. According to this *radical* anti-representationalism, we should seek to explain all instances of cognition and agency, including all instances of human cognition and agency, without the ascription of mental representations (Brooks 1991, Varela et al. 1991, van Gelder 1995, Thompson 2007, Chemero 2009, Hutto & Myin 2013, 2014).

According to this formulation, radical anti-representationalism is a methodological imperative. It holds that we should *seek* explanations without ascribing mental representations, and it is to be distinguished from the ontological claim that *there are no* mental representations. The ontological claim is, in a sense, more radical. But the outlined argument for the methodological claim would seem to provide the main reason for holding the ontological claim. In any case, in order to engage with anti-representationalism, we need not engage with the ontological claim. We can restrict our focus to the methodological claim.

4. Two standard responses

As mentioned, there are two common lines of response to the anti-representationalist challenges. The first appeals to sub-personal entities and mechanisms, the second is the response from representation-hunger. Our focus here will be the second response, which is first and foremost a response to radical anti-representationalism. But I will nevertheless begin with a brief sketch of the first line of response. This will provide an important background for the assessment of the anti-representationalist challenge, which will become relevant when we turn to modest anti-representationalism in section 7.

4.1 Sub-personal entities and mechanisms

According to the anti-representationalist challenge, explanations of skilled coping in terms of mental representations would be costly and clumsy, as I have put it. It is common to address this with the following qualification. According to representational theories, the explanation of human agency requires the ascription of mental representations that initiate and guide action. This does not mean that the agent must consider the relevant contents in conscious reasoning. If one holds, for instance, with Davidson (1963) that intentional actions are to be explained in terms of desires and beliefs, one is not thereby committed to the view that the agent must consider the contents of the relevant desires and beliefs in deliberation (Davidson 1978).³ Similarly, if one holds that intentional actions are initiated and guided by intentions, one is not committed to the view that the agent is consciously aware of the relevant intentions (before or during the execution of action). One may hold, rather, that the relevant intentions must be consciously accessible, not necessarily accessed (Mele 2009, for instance).

³ Davidson gives the example of an agent who adds spice to a stew with the intention of improving the taste, and he claims that what is required for this to be an intentional action is only that “he must have attitudes and beliefs from which, had he been aware of them and had the time, he *could* have reasoned that his action was desirable” (1978: 85).

With this qualification, representationalists want to make it clear that explanations of cognition and agency in terms of mental representations are not as costly as they might seem. But this response leaves the related charges of clumsiness and overpopulation unaddressed. It may still seem that explanations in terms of mental representations cannot explain the smoothness and ease with which many instances of skilled coping are executed, and it may still seem that we would obtain an implausible overpopulation with mental states in the explanation of complex movements—think, for instance, of all the finger movements that have to be initiated and guided when one is playing the piano or typing on a keyboard.

In order to address this, it has become common to refer to the sub-personal entities and mechanisms that one can find in scientific theories of motor control. According to one standard approach in cognitive science, the control of movements is explained in terms of “motor schemata” (also called “motor programs”). Motor schemata are theoretical entities and they are often characterized as “internal models” that consist, very roughly, of sets of commands that initiate and guide the execution of movements (Jeannerod 1997, Clarke 2010). For us, the important point is that they are assumed to be sub-personal entities that represent goal-states—they are assumed to be representational entities. According to schema theory, motor schemata are acquired and developed through experience and learning in an active engagement with the world. Once a schema for a certain movement has been built up with practice, it can then be executed with little effort and with no need of conscious attention or guidance. In other words, motor schemata often operate automatically in the service of higher-level goals and intentions, and they usually become embedded in hierarchical structures of goal-pursuit and intentional action. This, it should be noted, is perfectly in line with common experience, as we all know that the initiation and coordination of motor skills gets a lot easier with practice. When, for instance, one first learns how to play a chord on the guitar, one first attends to individual finger movements with the intention of moving and placing them in certain ways. With practice, simply intending to play the chord will suffice to play the chord, and eventually playing the chord can be initiated and guided by an intention to play a tune that features that chord.

Further, motor schema theory is now often supplemented with a feedback-comparator model of motor control. This view assumes a sub-personal motor control system that uses comparisons between motor commands, predictions of movements, and sensory feedback for the control and fine-tuning of bodily movements (Wolpert & Kawato 1998, Frith et al. 2000). Schema theory can explain how complex movements can be initiated and guided smoothly without much effort and without conscious control, and the feedback-comparator model can

explain how the guidance of particular movements can be tailored to the features of the particular circumstances. Taken together, schema and feedback-comparator theory help to address the mentioned issues concerning cost, clumsiness, and overpopulation. The execution and orchestration of complex movements can be explained in terms of the initiation and guidance provided by motor schemata and the feedback-comparator system. Given this, there is no need to assume that the execution of all individual movements must be governed by specific personal-level attitudes (such as desires, beliefs, and intentions). Motor schemata can be refined with practice and their execution can be further fine-tuned by the feedback-comparator system. This addresses the charge of clumsiness. And motor schemata can be executed automatically in the service of conscious goals and intentions, but without conscious attention and control. This further reduces the processing cost, and it helps us to see, moreover, that the challenge was overstated. When we acquire new motor skills, we often need to invest a great deal of mental effort and attention, and their execution often *is* rather costly and clumsy, at least at first. Supplemented with motor schema and feedback-comparator theory, representational theories can explain why that is, and they can explain why the cost and clumsiness diminishes with practice.⁴

4.2 Representation-hunger

The term “representation-hunger” was coined by Clark & Toribio (1994). After a discussion of examples from robotics and from dynamical systems theory that are commonly evoked by anti-representationalists, Clark & Toribio state the core of their response to the anti-representationalist challenge as follows:

The basic trouble is one that afflicts all the case studies mentioned above. It is that the kinds of problem-domain invoked are just not sufficiently ‘representation-hungry’. Instead they are, without exception, domains in which suitable ambient environmental stimuli exist and can be pressed into service in place of internal representations. (418)

⁴ In a similar proposal, Clark (1997) introduced the notion of “action oriented representations”: representations that “simultaneously describe aspects of the world and prescribe possible action, and are poised between pure control structures and passive representations of external reality” (49). They are assumed to be both belief-like and desire-like, and their primary explanatory import is to explain the smooth and effortless execution of the motor skills that are characteristic of skilled coping. Others posit similar representational entities, such as “motor intentions”, “motor representations”, or “goal representations”. See Pacherie 2008, Adams 2010, Butterfill & Sinigaglia 2012, for instance.

In cases of skilled coping, all the information that is required in order to initiate and guide an appropriate action is present in the environment. But it seems perfectly clear that this is not the case for all cases of cognition and agency. It seems, in fact, that paradigmatic examples of *human* cognition and agency involve cognition about things that are not present, such as in cases where our agency is guided by hypothetical reasoning or deliberation about the future. Such cases are representation-hungry in the sense that it is very difficult to see how they could be explained without the ascription of mental representations: agency is governed by cognition about things that are not present, and so it seems that something in the agent must “stand in” for the things that such instances of cognition are about. Clark & Toribio identified the two types of representation-hungry phenomena that have been discussed: cases that involve cognition about things that are absent, non-existent, or counterfactual, and cases that involve cognition about things that are unified at an abstract conceptual level—cognition about the absent and abstract, for short. Due to this, it seems clear that the case for non-representationalist explanations does not generalize. Alternative non-representationalist explanations are typically motivated by reflections on skilled coping, and they are tailored to explain such cases. But as the behavioral response is in such cases always governed entirely by “suitable ambient environmental stimuli”, there is no good reason to think that such explanations can cover the full range of human cognition and agency (which includes cognition about the absent and abstract and agency that is governed by such cognition).

This response from representation-hunger has shaped the debate about anti-representationalism to a significant extent. In a recent reply, Degenaar & Myin (2014) argue that cognition about the absent and the abstract are not so representation-hungry after all. Concerning cognition about the absent, they offer a sketch of the following non-representationalist account. Mental imagery can be construed in terms of the re-enactment and constructive reconfiguration of past experiences. One can combine this with a non-representationalist account of direct perception, which does not posit mental representations. From this, one obtains a non-representationalist account of mental imagery. This shows that cognition about the absent does not “necessitate mental representations as explanantia”, as Degenaar & Myin put it, because mental imagery is, of course, often about the absent.

Concerning cognition about the abstract, Degenaar & Myin argue more directly that it does not necessitate the ascription of mental representations. Cognition about the abstract is typically about states of affairs that have physically little in common. Degenaar & Myin grant that this involves “convergence of many variegated stimuli upon one neural correlate with physical integrity”. But they argue that this is not sufficient to “confer representational status”

(3646). The claim, as I understand, is that it would beg the question to presume that the neural correlates of such integration processes are the physical realizers of mental representations.

All this raises a host of questions and issues. Cognition about the absent is clearly not exhausted by mental imagery, and we have been given no clue as to how we can explain phenomena like hypothetical reasoning or deliberation about the future without the ascription of mental representations. But even for mental imagery, it is unclear how it can be explained as the re-enactment of *direct* perception, as direct perception would seem to require the presence of what is perceived. Further, it may be true that cognition about the abstract does not “necessitate” mental representations as explanantia, but it remains nevertheless very difficult to see how it can be explained by non-representationalist versions of embodied cognition.

I will not pursue those issues any further here. Rather, I would like to highlight the point that Degenaar & Myin took it for granted that they can meet the challenge from representation-hunger by addressing cognition about the absent and abstract. They took it for granted, that is, that cognition about the absent and about the abstract exhaust the domain of representation-hungry phenomena. In what follows, I will argue that this assumption is mistaken, because there is another important representation-hungry phenomenon: our ability to consider, choose, develop, and pursue intentions and long-term plans—our ability to engage in planning agency, for short. The main point will be that the radical and the more modest versions of anti-representationalism face a serious challenge from representation-hunger, even if we assume, for the sake of argument, that cognition about the absent and the abstract are not representation-hungry.

5. Temporally extended planning agency

In the philosophy of mind and action, it is generally agreed that intentionality is the mark of genuine agency. For some time, it was also generally agreed that intentional agency can be explained in terms of the roles of the agent’s desires and beliefs (largely due to the influence of Davidson 1963). In particular, it was widely assumed that to act intentionally is to act for a reason, and that acting for a reason is to be explained in terms of causation and rationalization by the agent’s desires and beliefs. It is still widely held that there is a close connection between intentional action and acting for reasons—that intentional actions are *usually* performed for reasons. But the underlying claim that intentions can be reduced to desires and beliefs is now widely rejected (largely due to the influence of Bratman 1987). According to most contemporary versions of this standard theory of action, intentions play a crucial and

irreducible role in practical reasoning, long-term planning, and in the initiation and guidance of action. On this view, the intentionality of action is to be explained in terms of the initiation and guidance by *intentions*, construed as irreducible mental states.

My argument against anti-representationalism will not depend on the claim that intentions cannot be reduced to desires and beliefs, and I will not summarize the arguments for this claim. But the following considerations are of relevance here. The claim that intentions are irreducible mental states can be motivated and defended on the basis of observations concerning our ability to engage in planning agency. The main idea behind this is relatively easy to see. The pursuit of plans often requires resolve and persistence—it requires mental states that are relatively stable. This stability is psychological and rational in nature. In particular, commitment to a plan requires that one does not reconsider the pursuit of the plan unless one has good reason to do so. Some desires are relatively persistent. But their stability is often merely psychological, in the sense that they tend to persist even if one has good reason not to pursue the desired end. Other desires are rather fleeting. Generally, it seems that desires (in combination with beliefs) do not provide the right basis to account for temporally extended and committed planning agency. Intentions, on the other hand, are individuated in terms of functional roles that provide the required stability by definition. For us, the important point is that any theory of intentional agency must account for the truism that we are able to develop and pursue long-term intentions and plans (Bratman 1987 and 2000). The question of whether or not intentions can be reduced to other mental states is a separate issue that we can set aside here.

On a terminological note, I often use the terms “intention” and “plan” interchangeably, under the assumption that plans are intentions. Sometimes, I use “plan” in order to emphasize the long-term and complex nature of some intentions. But there is no strict distinction implied. Intentions and plans can be concrete and specific. But they can also be rather abstract and vague, such as the plan to study law or to go on vacation sometime in April to some place with beautiful beaches.

In what follows, I will contrast temporally extended planning agency with cases of skilled coping. In a sense, every instance of agency is of course temporally extended. But in cases of skilled coping the agent’s activity and engagement with the world is initiated and guided entirely by what is present, *here and now*, in the current circumstances (as the proponents of embodied cognition like to emphasize). When we engage in planning agency, in contrast, we form an intention, *here and now*, that is to be pursued and executed *in the future*. In this sense, planning agency is temporally extended, and skilled coping is not.

Further, planning agency is often temporally extended in the sense that it requires the further specification and development of intentions and plans. First, for instance, you decide to go on vacation sometime in April to some place with beautiful beaches. Later, you specify and develop the plan further by making decisions on places, times, means of transport, and so on.

In the following section, I will argue that planning agency is a representation-hungry phenomenon. But first, I need to show that planning agency cannot be reduced to cognition about the absent and abstract. Intentions and plans are often based on deliberation about the future. Deliberation about the future is obviously about something that is not yet present and it is often conducted in abstract terms (including abstract normative terms, such as goodness, obligation, or reasonableness). One might think, then, that deliberation about the future can be reduced to cognition about the absent and abstract. If we assume that deliberation about the future can be reduced to cognition about the absent and abstract, we can see clearly that planning agency cannot, because planning agency is clearly not exhausted by deliberation about the future. In deliberation, the agent considers, here and now, what to do in the future. Planning agency usually involves more than that. It usually involves deliberation, the formation of intentions, and the pursuit and execution of the intended goals and actions. More to the point, cognition about the absent and abstract is something that the agent engages in here and now, whereas planning agency involves the pursuit and execution of intentions in the future. This shows that the ability to engage in planning agency cannot be reduced to the ability to engage in cognition about the absent and abstract. The upshot is that planning agency may be a representation-hungry phenomenon, even if cognition about the absent and the abstract are not.

6. The representation-hunger of planning agency

On the face of it, planning agency is a representation-hungry phenomenon, mainly for the following two reasons. First, in planning agency one pursues and executes plans that were formed or acquired at some point in the past. It seems that this pursuit of goals and actions must in some way be governed by something in the agent, some internal state, that mediates between the formation of the intention and the pursuit of the intended goals and actions. The most obvious candidate for such a mediating state seems to be an intention or plan, construed as a mental state that represents which goals and actions are to be pursued. Second, as mentioned, intentions and plans govern not only future actions, but also further deliberation and planning on how, exactly, to pursue and realize those plans. Typically, one does this by developing a hierarchical structure that specifies sub-goals, sub-actions, and sub-means

(Austin & Vancouver 1996). The most obvious theoretical framework to account for this systematic complexity seems to be a representational theory of cognition and agency, with its emphasis on internal processing, systematicity, compositionality, and cognitive decoupling (see Fodor & Pylyshyn 1988, for instance).⁵

However, we have seen that we should be more careful. It may seem clear that a certain phenomenon *invites* the ascription of mental representations, and yet it may be false that its explanation *requires* the ascription of mental representations. However, I do not think that we need to show that a phenomenon “necessitates mental representations as explanantia” in order to show that it is representation-hungry (as suggested by Degenaar & Myin 2014). The challenge from representation-hunger is not supposed to disprove anti-representationalism by providing an unassailable argument that establishes necessitation. The challenge is more modest. It is supposed to raise a serious challenge for anti-representationalism by showing that the explanation of a certain phenomenon *calls for* an explanation in terms of mental representations.⁶ This, I propose, requires two things. First, if it is not obvious, it must be shown that the phenomenon in question can be explained in terms of mental representations. Second, if it is not obvious, it must be shown that it is *very difficult to see* how one could explain the phenomenon without the ascription of mental representations. In other words, to show that a phenomenon calls for an explanation in terms of mental representations requires an inference to the best explanation in the form of the following inference to the *only* explanation: an explanation in terms of mental representations provides the best explanation, because it provides the only plausible explanation of the phenomenon in question.

As indicated, the explanation of planning agency clearly invites the ascription of mental representations—it is obvious that it can be explained in terms of mental representations. What needs to be shown, then, is that it is very difficult to see how planning agency can be explained without the ascription of mental representations. How can this be achieved? I suggest the following divide-and-conquer strategy: I will consider the explanatory resources that current anti-representationalist versions of embodied cognition have on offer, and I will

⁵ Fodor & Pylyshyn (1988) appealed to systematicity and compositionality in order to argue for a classical symbol processing account of representationalism and for the language of thought hypothesis, in particular. My point here is much more modest: the complex hierarchical systematicity of planning agency seems to call for a representational theory of cognition and agency. No further claims about symbol processing or about a language of thought are implied.

⁶ This is how I understand Clark & Toribio’s (1994) challenge. They took themselves to have identified a serious challenge, not an unassailable proof that establishes an impossibility.

show that they cannot explain planning agency. This, I submit, will suffice to show that it is very difficult to see how planning agency could be explained without the ascription of mental representations. It will not establish that a non-representationalist explanation is impossible, mainly because it will be based on considerations concerning the explanatory resources of *current* anti-representationalist accounts. But it will raise a serious challenge for anti-representationalism, as we will see.

There are by now many different accounts of embodied cognition on offer. We focus here on the anti-representationalist variants, and we can identify five explanatory resources that this approach to cognition and agency has on offer: explanations in terms of (1) affordances, (2) re-enactment, (3) behavioral dispositions and habits, (4) the internalization of linguistic and socially scaffolded abilities, and (5) dynamical systems theory. These are the explanatory resources of anti-representationalist versions of embodied cognition, as we currently know them. We turn now to each one in turn.

6.1 Affordances

Most anti-representationalists appeal to affordances, but there is no generally agreed account or definition. In this respect, the notion of affordance is the non-representationalist counterpart to the notion of mental representation. But as for mental representation, we can identify a shared minimal characterization. Borrowing from Chemero (2009: Ch. 7), affordances can be characterized as “directly perceivable opportunities for action”. The main idea here is that the way in which we perceive the world is already structured in terms of possibilities for action and interaction: we perceive the world in terms of the actions it affords. The explanatory import of the appeal to affordances is to explain how an agent can interact with the environment in an intelligent and appropriate manner without conscious deliberation and without having to represent parts or aspects of the situation. The suggestion is that affordances can explain this, because they are objective features of the situation that can “bring forth” the relevant responses and interactions, typically in interaction with the agent’s behavioral dispositions and habits (Gibson 1979, Chemero 2009; see also Clark 1997, Menary 2007).

No matter how this idea is further developed, it is clear that an appeal to affordances cannot explain planning agency. When one pursues and executes intentions and plans, one must be sensitive to the features of the particular situation. But, in planning agency, actions and interactions are partly governed by intentions and plans, not merely by the features of the present circumstances. In particular, they are governed by intentions and plans that the agent has formed at some point in the past, and the agent is governed by them through changing

and, sometimes, unpredictable circumstances. In other words, in planning agency, actions and interactions are often governed with a high degree of independence from the present circumstances. Appeal to affordances may help to explain intelligent interactions that are governed by features that are present, here and now. But it clearly cannot explain temporally extended planning agency.

6.2 Re-enactment

As mentioned (section 4.2), it has been proposed that mental imagery can be explained in terms of the re-enactment of perceptual experiences. Combined with a non-representationalist account of direct perception, this seems to provide a non-representationalist account of mental imagery (Degenaar & Myin 2014). The re-enactment of perception is temporally extended, in the obvious sense that an earlier instance of perception is enacted later. But it is nevertheless very difficult to see how an appeal to re-enactment could possibly explain planning agency. Perhaps, one might think, it is possible to explain deliberation and practical reasoning entirely in terms of the re-enactment (and re-combination) of past experiences. But even if that were possible, it would not help to explain planning agency. Intentions and plans are often based on deliberation and practical reasoning, but planning agency involves clearly more than that—it involves the pursuit of intentions and plans in the future (see section 5). One possibility here is to explain the initiation and guidance of future actions in terms of the re-enactment of deliberation. But this is hopelessly implausible, and it is contradicted by an enormous amount of evidence from everyday experience. When you get up in the morning in order to catch a plane, for instance, you do not have to remind yourself of the reasons for travelling. Once we have formed an intention or made a plan, we are able to pursue it without having to repeat the deliberation and without having to remind ourselves of the reasons at every step in the pursuit and realization of the plan (see Bratman 1987). I cannot see any other way in which an appeal to re-enactment might help here, and so I conclude that it cannot explain planning agency.

6.3 Behavioral dispositions and habits

Behavioral dispositions and habits are usually acquired in processes of development or learning and they are usually manifested later, under certain conditions. Appeal to behavioral dispositions and habits can thereby explain the initiation and guidance of future actions, and so it can explain how agency can be temporally extended. But it will become clear that it cannot explain temporally extended *planning* agency.

Let us begin with habits. Representationalist theories usually hold that habits can be explained in terms of the initiation and guidance by the relevant mental states. Davidson, for

instance, noted that “we cannot suppose that whenever an agent acts intentionally he goes through a process of deliberation or reasoning” (1978: 85). His example is an agent who adds spice to a stew with the intention of improving the taste. We can certainly imagine that this action is habitual, such that the agent’s mind is preoccupied with something else. The action seems nevertheless to be intentional, given that it is governed by the relevant representational mental states (in this case, the desire to improve the taste and the belief that adding spice is the appropriate means to this end).

Non-representationalist theories need a different account. The obvious candidate is a direct appeal to behavioral dispositions or tendencies. With repetition and practice, the agent acquires dispositions to perform certain actions in certain circumstances, and such processes may be construed as changes in the brain, changes in the body, or as changes in the person as a whole. Like all dispositional properties, behavioral dispositions interact with their stimulus conditions, which explains how the relevant circumstances can play a role in the initiation and guidance of the behavior. It is clear, however, that not all the relevant aspects of planning agency can be explained in terms of such a non-representationalist account of habitual action.

Consider again one of our examples. You form the intention to go on vacation sometime in April to some place with beautiful beaches. In order to explain this in terms of a habit, you would have to have the habit to take such vacations. Now, of course, you might have this habit, but you might just as well not. This points to an important feature of our ability to engage in planning agency: it enables us to plan and pursue *novel* actions and projects. For all we know, it might be the first time that you plan to go on a vacation sometime in April to some place with beautiful beaches, and it might be the first time that you plan to go on a vacation by yourself. You may have no relevant habit, not even of going on vacations, and yet you are able to make and pursue the plan. Obviously, examples could be multiplied. Consider someone who plans to do a Master’s degree in cognitive science. Few people do more than one Master’s degree, and hardly anyone can be said to have a habit of doing so. Yet, we are able to plan and to do such things.

Now, most of the particular actions that one performs in pursuit of a novel plan may be habitual. But even if all of the particular actions are habitual, the overall *orchestration* of the plan may still be novel. It may be, for instance, that all the actions that you perform in order to realize your plan of going on vacation are habitual (getting out of bed, calling a taxi, boarding a plane, and so on). It may still be that this is the first time that you pursue this plan—this particular constellation of the habitual actions in question.

This shows that planning agency cannot be explained in terms of habits. But it does not show that planning agency cannot be explained in terms of behavioral dispositions, because not all behavioral dispositions are habits. In particular, not all behavioral dispositions are acquired in processes of habit formation. The acquisition of some behavioral dispositions may be the development of innate tendencies. Others may be acquired in instances of one-shot learning, in which only one encounter with a rewarding (or punishing) event is sufficient to establish the disposition. Further, it is possible that we acquire behavioral dispositions by making decisions. In particular, anti-representationalists may suggest that making a decision just is the formation of a behavior disposition (or cluster of dispositions).

This is not entirely implausible. Consider so called “implementation intentions”:
intentions to perform certain actions in certain circumstances (Gollwitzer & Sheeran 2006). Suppose, for instance, you decide to invite your friend for dinner when you see her at work. The suggestion is that this consists in the formation of a disposition to perform the relevant speech act when the condition obtains. This, it seems, shows how planning agency can be explained without the ascription of mental representations.⁷ However, all it shows is that the ascription of very simple and specific intentions may not require the ascription of mental representations. There are many instances of planning agency that are more complex, and it remains very difficult to see how the appeal to behavioral dispositions could possibly explain more complex cases.

As noted, many intentions and plans have contents that are relatively vague, abstract, and potentially very complex. Consider again the intention to do a Master’s degree or to go on vacation sometime in April to some place with beautiful beaches. The content of such intentions need not and usually does not specify particular actions, because when one forms such intentions, the plan is usually still too vague and abstract. Indeed, it seems clear that one cannot have or acquire any behavioral dispositions in such cases, because there are no particular act-types that correspond to the contents in question. In order to facilitate the acquisition of behavioral dispositions, the content of such intentions must first be made more specific. This means that the formation of intentions with such contents cannot be reduced to the formation of behavioral dispositions—behavioral dispositions can ground only the

⁷ This is traditional behaviorism, according to which the ascription of mental states can be analyzed in terms of the ascription of behavioral dispositions. This view is untenable for well-known reasons. In this section, I will argue that it is untenable for further and independent reasons concerning planning agency.

ascription of contents that are relatively simple and concrete.⁸ This shows, then, that the formation of intentions and plans cannot, in general, consist in the formation of behavioral dispositions.

Note that this point concerns, in part, the abstract nature of many of our intentions and plans. This does not mean that the representation-hunger of planning agency can be reduced to the representation-hunger of cognition about the abstract. Cognition about the abstract is something that one engages in here and now. Planning agency is temporally extended. In order to explain planning agency, one must explain how intentions and plans that are formed here and now can initiate and guide further planning and future action.

6.4 The internalization of linguistic and socially scaffolded abilities

In broad outline, the main idea here is that we acquire the higher functions that are distinctive of human cognition and agency by being brought up in and by interacting with a socio-cultural environment that is already loaded with symbols, norms, meaning, and shared purposes (Clark 1997, Menary 2007, Hutto & Myin 2013). Later in development, some of those abilities become *mental* abilities through processes of internalization (Vygotsky 1986, Sterelny 2010). This is a grand vision, and there is no commonly accepted and fully developed version of this view. To get a better grip on the idea, it will help to consider an example. Take, for instance, the abilities to count and add numbers. It seems that those are paradigmatic examples of tasks that we do “in our heads”—they are examples of “mental arithmetic”. However, we typically learn how to count and how to add by being taught how to perform embodied actions, using our fingers for counting, grouping apples and oranges, and so on. It seems that it is only later, with practice, that such activities become mental activities, through processes of internalization. Let us grant that this appeal to the internalization of abilities is plausible and tenable. Can it help to explain planning agency?

A first thing to note here is that this approach seems to get the order of explanation backwards. The suggestion would be that planning agency can be explained in terms of the internalization of linguistic and socially scaffolded abilities. But it seems that in order to be able to participate in linguistic and social practices one must already have the ability to engage in intentional planning agency. This is clear for instances of explicit learning, in

⁸ I do not mean to suggest that behavioral dispositions are entirely inflexible. It must be acknowledged, on all views, that particular manifestations of behavioral dispositions can be sensitive to the particular constraints of the situation and that they can exhibit some flexibility in the expression of the type. But this does not ground the ascription of the kinds of contents under consideration here.

which one is taught to follow certain rules, as the ability to follow rules seems to require the ability to form and pursue intentions. But this point holds also for higher cognitive abilities that are acquired implicitly, such as by learning through imitation. In such cases, one does not engage in planning agency by way of following rules. But one is, nevertheless, already engaged in shared and cooperative agency when one acquires linguistic and social skills in such ways. And it seems that the ability to engage in shared and cooperative agency presupposes the ability to engage in intentional planning agency. In general, and as argued by Tomasello et al. (2005), the ability to engage in “socially coordinated action plans” is a *precondition* for “uniquely human activities such as the creation and use of linguistic and mathematical symbols” and for “the creation of social practices and institutions” (676). As Tomasello et al. suggest, “linguistic communication without these underlying skills [of shared planning agency] is incoherent” (690).⁹

More importantly, the appeal to internalization generates a dilemma. To spell out the obvious, when an ability is internalized it becomes an internal state (process, structure, or property of the agent). What kind of state? Generally and metaphysically speaking, it seems that there are only two options. The internalization of abilities can be construed as the formation of representational mental states or as the acquisition of behavioral dispositions and habits (which can be construed, further, in terms of changes in the brain, changes in the body, or as changes in the person as a whole). Given this, anti-representationalists must construe the internalization of abilities in terms of behavioral dispositions and habits. But we have already seen that planning agency cannot be explained in terms of behavioral dispositions and habits. The only credible option, here, is to explain internalization in terms of mental representations. This, I think, is not much of a surprise, as the internalization of higher cognitive abilities appears itself to be a representation-hungry phenomenon.

In connection with that, note that an explanation of planning agency requires an explanation of how decisions, which result in the formation of intentions, can initiate and guide future behavior. It must identify something in or about the agent that establishes this connection: something that *mediates* between decisions that are made earlier and pursued later. Without this, planning agency remains mysterious. The appeal to linguistic and socially scaffolded abilities alone cannot explain how decisions can initiate and guide future behavior. Appeal to the *internalization* of such abilities might provide an explanation, because it evokes

⁹ No doubt, some anti-representationalists will deny this (in particular, enactivists such as Fuchs & de Jaegher 2009). I will not attempt here to bolster the arguments from Tomasello (and colleagues), but note instead that my main objection is the point that follows.

agent-internal states. But this brings us only back to where we were before. What kind of state could play this role? Anti-representationalists cannot assume that this connection is established by representational mental states. They must, it seems, assume that those connections are established by behavioral dispositions and habits. But, again, we have already seen that planning agency cannot be explained in terms of behavioral dispositions and habits.¹⁰

6.5 Dynamical systems theory

The central idea here is to treat cognitive systems as dynamical systems and to explain their behavior by adopting the mathematical tools of dynamical systems theory (van Gelder 1995). In broad outline, to treat cognitive systems as dynamical systems is to propose that they are closely coupled with their environment and that their behavior is to be explained in terms of this dynamical coupling. This amounts to a rejection of the view we can isolate cognitive systems and explain their behavior in terms of the interactions of their internal components or intrinsic properties. As Silberstein & Chemero (2011) put it, this view replaces a “component-dominant” approach with an “interaction-dominant” approach. Dynamical systems theory uses non-linear differential equations to describe and explain the behavior of such systems. Those equations capture multi-dimensional state spaces that describe how the relevant parameters and states of such systems evolve through time. The suggestion is that such descriptions provide explanations if they identify trajectories and patterns that support successful predictions.¹¹ One common feature of dynamical system accounts is the identification of “attractors” (or “attractor basins”). Very roughly, an attractor is a region in the state space towards which various parameters of the system gravitate when they get close

¹⁰ Hutto & Myin (2013) also appeal to scaffolded abilities, but they appear to reject the view that such abilities become internalized (137–138). On their view, mental arithmetic, and other cases of mental agency, are “decoupled” and “independent of context” (152–153). It has not become clear to me why this is supposed to show that mental abilities are not internalized in a way that raises a representation-hunger challenge. But, in any case, the important point here is that denying internalization is of no help in the present context, because only the internalization of linguistic and socially scaffolded abilities has the potential to explain planning agency.

¹¹ Kaplan & Craver (2011) argue that dynamical system descriptions are explanatory only if they indicate how the system parameters correspond to the interacting parts of an underlying causal mechanism. If correct, this undermines the view of most proponents of the dynamical systems approach, because they usually hold that the parameters correspond to emergent properties of system-environment couplings (not to the components of an underlying mechanism). I tend to agree with Kaplan & Craver, but I assume, for the sake of argument, that dynamical system descriptions can provide explanations independently of identifying causal mechanisms.

to it. They can be associated with actions and interactions that the system tends to exhibit under certain conditions.

Does this dynamical systems perspective explain planning agency? Can it explain planning agency? Proponents of this approach have themselves provided negative answers to the first question. For instance, Dreyfus (2000a) appeals to dynamical systems theory in his defense of modest anti-representationalism:

Past experience has set up the neuron connections so that the current perceptual input, which is similar to some past input but never exactly like it, puts the brain area that controls movement into a specific energy landscape. Once that brain area is in that landscape, movements are caused that tend to move the brain state closer to the bottom of the nearest basin of attraction. (2000a: 382)

The main claim, here, is that dynamical systems theory can provide a non-representationalist account of habitual behavior and habit formation. But, as I have argued, not all planning agency is habitual. Even if the execution of certain plans consists entirely in the execution of habitual actions, the orchestration of such actions may nevertheless be novel and not habitual. Dreyfus seems to accept this, and he seems to accept that the explanation of intentional planning agency requires the ascription of representational mental states.

Silberstein & Chemero (2011) offer a rather different account of agency in terms of dynamical systems theory. Approaching this issue, they discuss an experiment in which participants play a simple video game by using a mouse:

Because the mouse and the object it controls on the monitor are constituent parts of the interaction-dominant cognitive system, there is no separation between the cognitive system and the environment that must be bridged by representations. [...] This anti-representationalism is [...] the key to the understanding of agency and action. (2011: 6)

The focus of their investigation is restricted to agency that is initiated and guided entirely by the features of the circumstances. This is, unfortunately, characteristic of much of the work on embodied cognition. “The system and the environment are inseparable” and “agent and environment are co-dependent sides of the same coin”, as Silberstein & Chemero maintain, and “so there is no need for intervening representation” (2011: 11 and 15). As should be clear by now, this neglects the obvious. It neglects the truism that we are planning agents, and that planning agency is temporally extended, in the sense explained.

More importantly, Silberstein & Chemero seem to admit, implicitly, that the dynamical systems perspective cannot explain temporally extended planning agency. When they address

the question of how to construe intentions within the dynamical systems approach, they follow Juarrero (2010) in suggesting that intentions are “order parameters that constrain the activity of system components” (Silberstein & Chemero 2011: 15). This means, in part, that having an intention is an emergent property of the “brain-body-environment” system, rather than an internal state of the agent, and it means that intentions “do not act as efficient causes”. Rather, intentions, so construed, “must somehow correspond to the intentional structuring of action, without being something over and above the action” (14). On this view, intentions are necessarily intrinsic to the action itself—they are, quite literally, *in* the action. This makes it perfectly clear that this view cannot explain planning agency. The explanation of planning agency requires intentions that can be formed here and now and pursued in the future—it requires intentions that are the antecedents of action. Given this, it is clear that planning agency cannot be explained by the offered dynamical systems account.

According to Silberstein & Chemero, intentions must be intrinsic to the action, because agency is to be explained in terms of the inseparable coupling between agent and environment. But perhaps they are wrong about this. More generally, perhaps the proponents of the dynamical systems approach are misled by their focus on skilled coping, and perhaps that is why they overlook that dynamical systems theory might provide the resources to explain planning agency after all.

There is, it seems, an obvious possibility. One might suggest that intentions can be identified with attractors that *evolve over time*. It might seem that this can explain how intentions can be formed here and now and executed in the future, and it might seem that this accommodates the point that some intentions are further developed in the pursuit of the goal. This is a possibility. But it generates a fatal dilemma. It seems that such attractors would have to correspond either to properties of the coupled agent-environment system, as suggested by Silberstein & Chemero, or to internal states of the agent. The former cannot be correct. The circumstances in which an intention is formed are often very different from the circumstances in which it is further developed and pursued. Agent-environment couplings, which are changing constantly, simply do not provide physical realizers that are stable enough to be the physical realizers of intentions and plans. The role of intentions is to take the agent from their formation to their execution, *through changing circumstances*. Given this, it seems that their physical realizers must be states of the agent. On the dynamical systems approach, this means that the relevant attractors would have to correspond to states of the agent. What kinds of states might that be? As before, it seems that there are only two candidates: representational mental states and behavioral dispositions (which may be construed as properties of the brain,

the body, or of the person as a whole). Appeal to the former is, of course, not an option for anti-representationalists, and I have already argued that the appeal to behavioral dispositions cannot explain planning agency. It cannot explain, in particular, the development, orchestration, and execution of novel plans and actions.

Here is another way to look at this. In order to explain planning agency, the appeal to attractors would have to explain our ability to further develop and specify our intentions and plans. The formation of plans often begins at a fairly abstract level and their development typically follows a hierarchical structure of specification (Austin & Vancouver 1996). You intend to take a vacation sometime in April at some place with beautiful beaches. As you go along, you specify sub-goals and means. In order to capture such planning agency, attractors would have to be assigned *abstract contents* and separate attractors would have to be associated, somehow, with the relevant sub-goals and means of such *hierarchical structures*. Further, in order to explain how intentions and plans can be pursued through changing environments, such attractors would have to correspond to relatively *stable states* of the agent. Taken together, all that just means that such attractors would have to correspond to representational mental states. Dreyfus remarked that attractors that explain agency “could be called representations”, but only in a “very weak sense” (2000a: 383). We can see now that attractors that can explain *planning* agency would *have to be* called mental representations in a very strong sense.

Another possibility is to appeal to so called “coordinative structures”. Defined in the abstract, coordinative structures are “macroscopic spatio-temporal patterns” that constrain the degrees of freedom of some of the system’s component parts (Huys et al. 2004: 360). Proponents of the dynamical systems approach have introduced this notion to explain how the motor system selects one particular string of movements in order to achieve a given goal. It is clear that, in this application, coordinative structures are not supposed to explain anything as high-level as the kind of planning agency under consideration here. But we can ask, again, whether coordinative structures might be of help in this respect.

Arguably, coordinative structures must be relatively stable features of the agent in order to constrain some of the agent’s degrees of freedom. However, as argued above, in order to explain planning agency, such states of the agent would have to be assigned abstract contents that can be organized in hierarchical structures. So, as before, we would have to assume that those states carry the hallmarks of mental representation.

7. The challenge to radical and modest anti-representationalism

The explanatory resources of anti-representationalist versions of embodied cognition cannot explain planning agency. It is, at least, very difficult to see how any one of them could, and it is very difficult to see how any combination of those explanatory resources could. We can conclude, then, that current anti-representationalist versions of embodied cognition do not have the resources to explain planning agency, and we can conclude that planning agency is indeed a representation-hungry phenomenon. This is a serious challenge for both radical and modest versions of anti-representationalism.

According to radical anti-representationalism, we should seek to explain all instances of human cognition and agency without the ascription of mental representations. The ability to engage in planning agency is not an expert skill or some fringe ability that is rarely used. It is, rather, an important ability at the very core of human cognition and agency that governs and constrains most of our daily activities. Non-representationalism does not provide the resources to explain this very important core ability. As we have seen, the problem is not just that there is no fully worked out and generally accepted non-representationalist account. Far from it, the problem is that non-representationalist versions of embodied cognition do not even provide an indication or programmatic sketch as to how they might explain planning agency. Given this, the methodological imperative that we should seek explanations of all instances of human cognition and agency without the ascription of mental representations is misguided. The pursuit of non-representationalist explanations has delivered interesting and important insights, and it may well be that it will continue to do so. But there is, as I have argued, no reason to think that non-representationalist accounts will ever be able to explain the full range of human cognition and agency (including planning agency).

According to modest anti-representationalism, a significant portion of human cognition and agency is to be explained without the ascription of mental representations. Typically, this view restricts its anti-representationalism to the explanation of skilled coping, broadly construed, and it grants that the explanation of higher cognition and deliberate planning agency does require the ascription of mental representations. But this restriction of anti-representationalism to skilled coping does not save the view from the present challenge.

Note, first of all, that most instances of skilled copying are in the service of higher intentions and plans. They are usually sub-actions or sub-routines that we perform in order to achieve higher ends or long-term goals. Consider embodied skills such as typing on a keyboard, playing chords on an instrument, or all the sub-actions that one performs when one is driving a car. Such actions are usually not performed for their own sake, but in pursuit of

some higher intention or plan. This raises the obvious question of how the relevant higher intentions and plans can initiate and guide the performance of skilled coping.

Representationalism can offer an answer in terms of sub-personal entities and mechanisms, as outlined in section 4.1. With practice, we build up a repertoire of motor schemata, which explains how the execution of motoric skills can become automatic and embedded in higher planning structures of intentional agency. The guidance of particular instances can be explained by a feedback-comparator theory of motor control. How this works, exactly, is largely an empirical question. But representationalism provides the basic idea: skilled coping can be initiated and guided by higher intentions and long-term plans, because the relevant personal level and sub-personal level entities are all *representational* entities (see Pacherie 2008, Clarke 2010, Butterfill & Sinigaglia 2012, for instance).¹²

Note, further, that even instances of skilled coping that are not in the service of higher intentions and plans are usually *constrained* by them. Consider, for instance, actions such as going for walk or whistling a tune. Often, such actions are spontaneous, in the sense that they are not planned. But even if they are not planned, they are usually constrained by the agent's plans and the commitments that they entail. Usually, one does not go for a walk or whistle a tune whenever the circumstances permit or whenever one feels like doing so. Rather, usually one does so only when the circumstances permit and only when it coheres with one's overarching intentions and plans. Now we face the question of how intentions and plans can constrain the performance of such actions. Again, representationalism suggests an answer. As the execution of such spontaneous actions is assumed to be guided by representational entities, such as motor schemata, we can see how their performance could be constrained by other representational entities, such as intentions and plans.

The challenge for modest anti-representationalism is to find an alternative answer. How can higher intentions and long-term plans initiate, guide, and constrain instances of skilled coping, given that skilled coping is, by hypothesis, *not* to be explained in terms of representational mental states? It is very difficult to see how modest anti-representationalism

¹² Butterfill & Sinigaglia (2012) point out that such explanations face a difficult "interface problem": how do the propositional contents of intentions interface with the non-propositional contents of motor representations (at the sub-personal level)? They consider a solution in terms of "translation": a sub-personal mechanism may translate the contents of intentions into the more specific format of the contents of motor representations (see also Pacherie 2008). But as we have currently no direct evidence for the existence of such a mechanism, they advance an alternative explanation in terms of "deference": intentions refer to specific motor actions by deferring to motor representations.

could possibly square this circle, because the view grants that higher intentions and long-term plans *are* representational mental states. Modest anti-representationalism turns out to be an unstable position. Consider the following three propositions:

- (1) The explanation of skilled coping does not require the ascription of mental representations.
- (2) Skilled coping is often initiated, guided, or constrained by higher intentions and long-term plans.
- (3) Higher intentions and long-term plans are mental representations.

Modest anti-representationalism is committed to 1 and acknowledges 3 (unlike radical anti-representationalism, which denies 3). Above, I have argued for 2. Given this, we obtain a contradiction. Given 2, skilled coping is to be explained, at least in part, by higher intentions and long-term plans. This contradicts 1, given 3.¹³

8. Conclusion

Planning agency cannot be reduced to cognition about the absent and abstract, and it is very difficult to see how it could be explained without the ascription of mental representations. We have seen, in particular, that anti-representationalism faces a serious challenge from representation-hunger, even if we grant, for the sake of argument, that cognition about the absent and the abstract are not representation-hungry. It is important to note that this challenge does more than just identify another representation-hungry phenomenon. As pointed out, the challenge from cognition about the absent and abstract is a challenge to *radical* anti-representationalism, whereas the challenge from planning agency is a challenge to both radical *and* modest anti-representationalism. Moreover, we have seen that modest anti-representationalism is an unstable position. This is a very significant result, because most anti-representationalists are modest anti-representationalists (as far as I can tell).

¹³ According to Dreyfus, “there can be two distinct kinds of intentional behavior: deliberative, planned action, and spontaneous, transparent coping” (2002b: 417). This raises the obvious question of how skilled coping can be in the service of planning agency, and Dreyfus realizes that he cannot allow guidance by higher intentions and plans (because this would be guidance by mental representations). Dreyfus finds himself forced to propose that higher intentions and plans “simply trigger” instances of skilled coping. But this is highly implausible. It flies in the face of common experience, which suggests that instances of skilled coping are often also guided, modulated, and constrained by higher intentions and plans during their execution. Moreover, even a mere triggering has clearly explanatory import: if skilled coping is triggered by higher intentions and plans, then it is to be explained, at least in part, in terms of mental representations.

Clark & Toribio (1994) discussed the possible objection that the challenge from representation-hunger appears to be a retreat, rather than a victory, even if it is successful. The challenge, it may seem, concedes that mental representations are required only in order to explain particularly sophisticated “tip-of-the-iceberg” capacities that are deployed only in rare moments of conscious reasoning and reflective deliberation. The challenge may therefore appear to be a retreat, and one may think that the “moral victory” goes to the anti-representationalist after all (419 and 426). In their reply, Clark & Toribio pointed out that cognition about the absent and the abstract are far more mundane and widely used than the objection suggests. We frequently and quickly engage in counterfactual reasoning while we interact with the world, and we engage in cognition about the abstract whenever we subsume heterogeneous stimuli under some common category (426–427).

To this, we can add that planning agency is clearly not a particularly sophisticated or rarely used ability. As pointed out, planning agency orchestrates and constrains most of our everyday activities. It is, in fact, difficult to think of clear instances of human agency that are *not* motivated, guided, or constrained by our intentions and long-term plans. One might overlook this, because one might think that we do not very often engage in conscious deliberation and reasoning (relative to the overall number of judgments that we make very day). But only one conscious decision, such as the decision to take a vacation, can have a pervasive influence on our daily activities.

Further, planning agency appears to be an important core ability from an evolutionary point of view. The ability to make and pursue plans certainly appears to be highly advantageous and adaptive, in terms of fitness and survival. It may well be, even, that we are able to engage in cognition about the absent and abstract because this enables us to deliberate about the future, and it may be that we are able to deliberate about the future because this enables us to make and pursue plans.

All in all, we can safely conclude that the challenge from representation-hunger is by no means a retreat. It is a serious challenge for the radical and the more modest anti-representationalist versions of embodied cognition. Given this, we can conclude furthermore that the representationalist project remains well-motivated, because the explanation of human agency calls for the ascription of mental representations, notwithstanding the current lack of a generally accepted account of mental representation.

Finally, let me briefly address the question of why the debate about anti-representationalism has overlooked planning agency. One reason may be the focus on skilled coping and on agent-environment couplings. This focus is characteristic of the anti-

representationalist approach, but, to some extent, it has also steered representationalist theorizing. For instance, a good deal of attention has been devoted to the debate on the nature and explanatory power of so called “action oriented representations” (Clark 1997).¹⁴ The two main questions here have been whether the appeal to action oriented representations can explain skilled coping and whether they are genuine representations (Wheeler 2005, Gallagher 2008, Adams 2010, Clowes & Mendonça 2016). These are interesting and important questions. But the focus on such questions concerning skilled coping may have led to the neglect of equally interesting and important questions concerning planning agency.

It has become clear, I hope, that our ability to engage in planning agency requires more attention than it has received in this debate. Any theory that claims or aspires to provide a satisfactory account of human cognition and agency must show, or at least indicate, how it can explain our ability to make and pursue plans. The proponents of anti-representationalist versions of embodied cognition do not provide any clues—when it comes to explaining temporally extended planning agency, they do not even whistle in the dark.

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¹⁴ As noted (footnote 4), the appeal to action-oriented representations serves the same purpose as the appeal to motor schemata, motor programs, and the feedback-comparator system of motor control.

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