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Abstract

Thinking about the representational qualities of maps and models allows one to offer a new perspective on the nature of mindreading. The recent critiques of our dominant paradigms for mindreading, theory theory and simulation theory, by enactivists such as Daniel Hutto reveal a flaw in the standard options for thinking about how we think about others. Views that rely on theorizing or simulation to account for the way in which we understand others often appear to over-intellectualize social interaction. In contrast, enactivists champion embodied, non-representational forms of engagement with others. I claim that one can improve on representational views of social cognition by moving away from talk of the mental manipulation of propositions in favor of the construction of maps and models of others. Furthermore, I claim that the current state of social neurobiology lends itself to such a view.

Introduction

The interdisciplinary debate over how we come to understand the mental states of others has presumed that the output of so-called “mindreading” activity is a representation. One might argue over whether the representation in question emerges from theorizing, simulation, or something else, but there has hitherto been relative agreement that coming to understand another person involves coming to represent her mental doings. Relatively recently, a family of views has emerged as an alternative to theories that share the assumption of some form of representationalism. The most common label for these views is “enactivism”.

A distinguishing feature of the enactivist camp is a repudiation of representational theories of social cognition and often representational theories of the mind in general. How thoroughgoing an enactivist’s rejection of representation is will depend on the theorist.

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Enactivists as a tribe claim that (some) important work typically predicated of representations is done by some kind of embodied state instead of by representations. What is meant by “embodied state” and the preferred nomenclature for picking out embodied states can vary, but proponents of the view contrast these embodied states with representational ones. In this essay, I will examine the enactivist challenge as presented in Daniel Hutto’s 2008 monograph *Folk Psychological Narratives*, as his enactivism is one of the most thoroughgoing ones on offer and is overtly applied to the topic of mindreading. I will then present a representational account that learns the lessons enactivism has to teach us without repudiating representations.

1. Hutto on Intentional Attitudes

On Daniel Hutto’s view, one should reserve the term “mindreading” for the use of folk psychology to make sense of the actions of others in terms of reasons. Hutto doesn’t think this kind of mindreading does much of the work of allowing us to navigate social interactions. What does this work are “intentional attitudes” that do not involve mental representation. Mindreading, for Hutto, is a kind of narrative practice. Humans tell stories that make sense of the actions of others in terms of their beliefs, desires, and the like in language. This, says Hutto, is all there is to mindreading (Hutto 2008, 4). In fact, in Hutto’s opinion, the primary purpose of folk psychology is more nearly “mindtelling” than mindreading. We tell stories to others that make ourselves comprehensible when other people would be unable to respond appropriately to our behavior otherwise (Hutto 2008, 5ff.). Mindreading is sociocultural, and, according to Hutto, it does not have the deep biological basis that alternative theories of mindreading might think it does (cf. Hutto 2008, ix-x).

Hutto is aware of much of the literature having to do with mirror neurons, cognitive development, and autism marshaled by participants in the mindreading debate. He thinks that these findings are consistent with the presence of intentional attitudes that are not representational. One can be in a state that is directed at the mental state of another person without that state being a representation of the other person’s mental state or having a representation as a part. According to Hutto, the empirical evidence only supports the biological undergirding of intentional attitudes *simpliciter*, not intentional attitudes that happen to also be representational. One does not need to represent the presence of something to be responsive to it. One can instinctively react to something without doing so because one has represented it in some manner that licenses that reaction (e.g., the startle reflex).
Hutto thinks that our normal means of navigating the social sphere is like a sophisticated set of reflexes. One’s responses to social stimuli can be refined and trained. Nevertheless, Hutto thinks that social interactions depend on instinctive responses to stimuli, not information structures. He summarizes his view as follows.

Our primary modes of interpersonal engagement are not driven by mentalistic predictions or explanations, rather they are characterized by the possession of embodied expectations. Such expectations are not intellectual products; arguably they are not the outcomes of the manipulation of representations by inferential operations at all—but, certainly they do not involve the manipulation or representation of propositional attitudes. Like most creatures, our basic dealings with others are more visceral; we get by with scriptlike patterns of recognition-response, some of which can be quite sophisticated and complex. . . . [W]ell-calibrated social activity only involves a capacity to selectively respond to end-directed intentional attitudes that are revealed in the expressions of others; these expressive attitudes are unlike those of the propositional variety. For this reason, among others, these primary modes of interacting with others should not be classified as a species of mindreading. (Hutto 2008, 3)

Hutto maintains that “basic embodied responding is not content-involving” (Hutto 2008, 45). One’s social reflexes cannot be explanations of anything. They do not of themselves pick out a proposition or bear logical relations to propositions any more than the startle reflex does. They do not refer to the stimuli that trigger them. In short, Hutto thinks that responding to a stimulus is not, of itself, sufficient for that response having semantic properties or anything like such properties. A response can be apt relative to its trigger without there being some kind of resemblance relation between the internal structure of the response and the thing eliciting the response.

What successful responding depends on is the existence of a correlation between specific signs and distal states of affairs. These hold good often enough, at least in the historically normal environments of organisms. But the signs themselves do no declarative work, nor are they interpreted as doing such by organisms or their perceptual mechanisms when they respond to them appropriately in discharging their proper functions. It is not as if one part of the system in any sense tells another that “this is how things stand” in the process. (Hutto 2008, 48-49)

Natural selection privileges some social responses to the environment and not others. To be subject to natural selection, a behavior only needs to covary with the conditions that make
that behavior adaptive. Covariance, of course, does not entail representation. Among other things, covariance is symmetrical and representation either is not or, at the least, need not be (Hutto 2008, 48-49).

Before turning to critique, let me draw attention to a valuable insight to which I think Hutto draws our attention. One way to re-state Hutto’s main point is that subconscious “know-how” can explain a lot of our social interactions, and it can do so without it being obvious that know-how requires a representation. After all, know-how embedded in a reflex seems capable of operating completely subconsciously while seeming to have some kind of intentionality.

It is plausible that knowing another person is both causally and developmentally dependent on lots of know-how. One way of glossing the increasingly complex series of interactions that occur between infant and caregiver in the first year of life is in terms of know-how. An infant emerges from the womb with an instinct for interacting with others. Within minutes of birth, an infant can imitate the facial expression of another person (cf. Meltzoff & Moore 1977). Taking advantage of this imitative impulse, the caregiver models more complex social behavior and gradually the infant is able to master the behavior being modeled. The caregiver is teaching the infant what to do when interacting with others. It would be unintuitive to say that what explains imitation in neonates is an ability to understand propositions about the caregiver’s mind. It is only slightly more intuitive to claim the neonate understands what the person he or she is imitating is doing. Rather, the infant appears to have an instinct or reflex for imitation, and this instinct is developed and refined as one develops.

Similarly, one way of thinking about an autistic person’s social deficits is as an impairment in engaging in the behavior of relating to another person. Autistic persons often act as if they have wandered out onto the stage of a play without knowing the script. It is not that the high-functioning autistic person lacks the requisite mentalistic concepts so much as the ability to use them productively. They simply don’t know how social interaction works. For instance, in her autobiography, Temple Grandin states:

I do not read subtle emotional cues. I have had to learn by trial and error what certain gestures and facial expressions mean. When I started my career, I often made initial contacts on the telephone, which was easier because I did not have to deal with complex social signals. (Grandin 2006, 156)
Grandin is not suffering from a misunderstanding of the concept of emotion so much as a know-how deficit. She does not know how to take part in the activity of giving and receiving social signals, but she is able to communicate effectively about the mental aspect of the interactions she has trouble with.

The enactivist picks up on the insight that social interaction is first and foremost an activity, and to do the activity one needs know-how. The lack of an emphasis on know-how renders alternatives such as theory theory and simulation theory over-intellectualized in the eyes of the enactivist. Theory theory posits the ability to think in a quasi-scientific way, and simulation theory posits an ability to reconstruct the subjective world of another person imaginatively. The enactivist, by contrast, need only appeal to one’s ability to pair a stimulus with an appropriate response.

It is far from obvious, however, that eschewing representation is necessary in order to take advantage of the insights Hutto provides. When Hutto discusses mental representations, he conducts his discussion as if anything that was a mental representation would also be a propositional attitude, and he seems to think that the only way we represent propositions is through sentences.3 Since the social interactions of nonverbals are, by definition, not conducted through the exchange of sentences, Hutto thinks that these interactions do not produce or depend on mental representations. Thus, when even verbal beings engage in the sort of behavior that a nonverbal being could engage in, one should not assume representations are involved.

Hutto’s fixation on propositions may blind him to the case for there being non-propositional representations involved at the level of “mere” intentional attitudes. A divide between propositional attitudes and states that merely covary with the environment in a non-representational manner ignores many candidates for mental representation that don’t appear to be propositional in form. Imagery, for example, is not propositional. It does not possess the semantic properties unique to propositions that Hutto is thinking of as individuating representations.

Notice, however, that mental imagery does not merely covary with what is imaged, or, at least, we do not typically expect covariance to be the deepest explanation of the similarity between an image and what is imaged. Rather, imagery has an internal structure that typically is meant to correspond in some way to what is imaged. As enactivist theories of perception are quick to point out, sensory imagery arises from a constructive, selective process imbued with know-how (Noe 2006). Perception is not the mere passive registration of what is imprinted on the senses like a seal in wax.
How close the resemblance of an image to an object needs to be to count as a successful correspondence is a hard question to answer, but we are familiar with cases where imagery covaries with a stimulus without counting as an image of that stimulus, such as in the case of synesthesia. The person with synesthesia might associate a certain color with a day of the week, but red imagery does not count as being imagery of Tuesdays just because there is a measure of covariance between red imagery and thoughts of Tuesdays. It may become a symbol for Tuesdays as one learns that one can impose a meaning on this co-varying relationship, but the experience of synesthesia lacks that kind of thick intentionality that sensory imagery typically features. To use a more controlled example, if one’s “historic normal environment” included an evil demon who flashed a mental image of a scary but physically impossible animal whenever it was adaptive for one to feel wary, the image would still not count as an image of a diverse set that includes rickety bridges, C-grade restaurants, and Greeks bearing gifts.

If mental imagery can serve a representational function, it is less clear that know-how is always devoid of representational content for the simple reason that know-how seems often to involve or rely on using various kinds of imagery to carry information. Researchers of the neurobiology of movement even see the need to posit “motor imagery” to accommodate their empirical data, an information structure that stores motor information independently of its being used to produce an action (cf. Gallagher 2008, 69).

When an action needs to be monitored and directed, one appears to imagine the movement and its execution using the same brain areas that would be carrying out the action. One guides the action by matching sensory, proprioceptive, vestibular, and efference feedback against the motor imagery that serves as the plan one is trying to execute. One then adjusts one’s further movements in accordance with the way in which feedback does or does not fit the image of what one is trying to do. The use of motor imagery is always at least partly subconscious, but it does not fit neatly with the folk concept of reflex as a blind reaction to a stimulus. Such reflexes there may well be, but know-how is a wider class that encompasses many abilities that appear to involve information structures such as sensory and motor imagery that need to encode something about the way the world is and the way we can act in it in order for us to have those abilities.

Denying that embodied interactions traffic in information structures about the other person appears to rob one of an essential criterion in determining whether know-how is present in some of even the simplest social interactions. Navigating social interactions involves more than reacting to the body configurations of others with adaptive body configurations of one’s own. It requires reacting to what those body configurations mean. If one happened to
run away from all aggressors because one found the facial expressions aggressors make ugly, one would not be engaging in successful social cognition. One would be varying one’s behavior in an adaptive manner in response to the social environment, but one would still be interacting unskillfully. Adaptive covariance does not a mindreader make, but it also does not appear to be sufficient for much of the social cognition that we accomplish without any noticeable reliance on propositions. Hutto is free to claim that the intentional attitudes he has in mind covary with stimuli in a way that is not merely adaptive, but it is hard to see how he will get the right level of specificity in the intentional attitude without an appeal to an information structure that counts as a representation.

In sum, Hutto helpfully draws our attention to the importance of know-how and the way in which social interaction is an activity we engage in rather than an intellectual operation. Nevertheless, there is reason to wish for a less radical alternative that can accommodate some of Hutto’s insights. In the next section, I will lay the groundwork for such a positive account using some insights from the philosophy of science on the representational features of maps and models.

2. Giere on Maps and Models

Observing the differences between kinds of non-mental representation can be useful for thinking through the possible forms that mental representations might take. Ultimately, I will argue that we can make progress towards understanding what it would mean to represent another person by reflecting on the ways that maps and models represent things. In this section, I will be exploring the representational qualities of maps and models using Ronald Giere’s views in the philosophy of science as a guide (Giere 2006).

Scientific perspectives, for Giere, are composed of models that represent some particular domain, and scientific practice is a matter of constructing, applying, and correcting these models. A model may use words, but it may also use numbers, graphs, images, or three-dimensional constructions. The aims of a scientific investigation might be satisfied by producing an end product of any of these forms so long as the model produced fits what is being modeled in relevant respects. Moreover, models can be more or less specific or general. One might have a mathematical model that represents a set of data on grasshopper migration patterns that supports a more general model of insect migration that is related to a still more general model of migratory behavior that supports a still more general model, and so on (cf. Giere 2006, 61, fig. 4.1).
There are many affinities between Giere’s work and the project of finding the right vehicle for information about other people. Scientific perspectives may adequately characterize many features of a domain that are left out of other perspectives including other equally valid scientific perspectives. Equally good models may vary dramatically according to the tools being used to construct and apply them or the features the models focus on. Perhaps most importantly for present purposes, Giere’s view provides a way to capture objective but perspectival phenomena in a way that does not require propositions. So it is, I will argue, with our knowledge of other people.

For example, a scientific investigation of a certain stretch of sea floor could produce a topographic map, a computer simulation of plate tectonic activity, photographic documentation of the state of sea floor life, a graphic representation of the flux of local fish populations, and so on. Each of these may be the products of a valid scientific undertaking and may exemplify scientific knowledge about the same stretch of sea floor. Nonetheless, each scientific product is the result of a different way of examining the same domain and produces a very different kind of result. The results produced will have some sort of interesting relationship with related propositions and scientific theorizing conducted through sentences that pick out propositions. Plausibly, however, a map or a model that results from a scientific endeavor need not itself contain or make reference to propositions.

For Giere, models are abstract representations that are intended to bear a relationship of similarity with some particular feature(s) of a target domain (Giere 2006, 63). Maps are physical objects that bear a relationship of similarity with the spatial distribution of some particular feature(s) of a target domain (Giere 2006, 72). For Giere, then, models and maps are related, though the nature of the relation is left somewhat vague (Giere 2006, 76ff.). They are not related in the manner of genus and species because models are supposed to be abstract in the very respect that maps are supposed to be concrete. Maps might be thought of as physical manifestations of models, but, if so, then maps as Giere conceives of them could not be the only possible manifestations. A graph of a bell curve can depict the distribution of red-headed persons in a locale without there being some set of red-headed objects shaped like a curve out in space-time somewhere.

Similarity is a fitting evaluative metric for a perspectival phenomenon. Similarity is feature relative. To say of two objects that they are similar, one must specify in what respect they are similar. One can find ways in which very similar objects are dissimilar and ways in which very dissimilar objects are similar. Moreover, what counts as similar or similar enough can depend on one’s practical interests without similarity thereby collapsing into a social construction. If we are looking for someone to impersonate Seth at
work, Danny will count as dissimilar because Seth and Danny do not look alike even though they may count as similar in numerous other respects due to having similar beliefs, desires, and mannerisms.

Similarity also comes in degrees. One of the motivations for calling a phenomenon perspectival is that different ways of approaching a domain yield different kinds of information, but another can be that different ways of approaching something might count as successful at different degrees of correspondence. The very same description of what a person is wearing may be impressive coming from an observer on the other side of a crowded room but woeful from someone doing her observing from close range.

Models and maps do not merely stand in a similarity relationship to what they are about. All things resemble each other in various respects. A map of Washington D.C. may resemble Washington D.C. in the way it distributes the symbols that are supposed to stand for the buildings in Washington D.C. The map and the city, however, also resemble each other by being physically extended, by being self-identical, by not having existed at the time of the Caesars, and so on. Furthermore, one might well think that the map resembles other maps of Washington D.C. more than it resembles the city of Washington D.C. Yet, we are not tempted to say that the map of Washington D.C. represents these other maps.

Giere appeals to “agent-based similarity” as what allows maps and models to represent (Giere 2006, 63).

Note that I am not saying that the model itself represents an aspect of the world because it is similar to that aspect. There is no such simple representational relationship. Anything is similar to anything else in countless respects, but surely not everything by itself represents something else. It is not the model that is doing the representing; it is the scientists using the model who are doing the representing. One way scientists do this is by picking out some specific features of the model that are then claimed to be similar in some specific respect to features of the designated real system. . . . Part of using a model to represent some aspect of the world is being able to pick out the relevantly similar features. Another part of using a model to represent something is having some reasonable idea of how good a fit might be expected. (Giere 2006, 63-64)

What Giere has in mind will be clearest if we focus on maps. One of the ways in which maps represent is by being partial (Giere 2006, 73). Unlike a photograph, which may show many extraneous details of what it is a photograph of, the act of constructing a map already
involves a selection of a subset of the phenomena that is relevant to the purposes the map might be put to. The map intentionally leaves out many of the features of the phenomena being mapped, and what remains is usually intentionally selected for.

The accuracy of some features of a map may be compromised for the sake of making a map easier to use. An example that Giere uses is that of the Mercator map of the Earth, which distorted the relative sizes of the Earth’s land masses (e.g., making Greenland look larger than it is). The introduction of inaccuracy in the Mercator map was the cost of creating a map that was easier to use for navigation (Giere 2006, 78). The Mercator map represents the earth due to a relationship of similarity, but it employs strategic inaccuracies so as to make it maximally usable.

Maps convey information through both a spatial similarity to what is mapped and the conventions that explicitly or implicitly apply to using a map (cf. Giere 2006, 73ff.). A rail map is given a particular hook-like shape so as to correspond to the shape of the actual rail line. The map conveys more information than the rough shape of the rail line, however. The implicit conventions of map use further dictate that the white circles placed on the rail line are over-sized symbols for the locations of rail stations and that the words on the map are the names of the locations of those stations. The spatial similarity of the map to the rail line allows one to superimpose symbols that enhance the information that the map can convey. Once one has mastered the conventions of the map, for example, one can know that the distance between Tottenham Hale and Finsbury Park is not as great as that between Finsbury Park and Brixton. The implicit conventions can be rendered explicit with such features as a key that explains what symbols stand for.

Agent-based similarity for a model is similarity among a certain range of features that are selected for in the making (or selecting) of that model. Agent-based similarity for a model should be the same as that for a map only adjusted to apply to a more abstract kind of representation. Feature selection may result from restricting the content of the model or altering the structure of the representational medium so as to emphasize the chosen features. The similarity is most fundamentally between the structure of the representational medium and what is being represented. This structure may be enhanced by tying secondary representational features such as symbols to parts of it. One expects feature selection to be rooted in the possible uses for which the map or model is constructed.

Notice that maps and models may be intimately tied to know-how and to one’s expectations for how what is mapped will change under various conditions of interaction. One of the things a tourist map does that a list of written instructions for approaching tourist sites does
not necessarily do is give one a sense of the way the terrain in question would unfold under many different ways of exploring it. A map gives one a sense of what to expect from one’s interaction with that environment relative to the features of the environment drawn attention to. The map presumes that one knows how to use the map, how to interpret its conventions or its key. The explanation for what features are included in the map will often be that the map empowers one to do certain kinds of things in that environment.

3. A Positive Account: Maps, Models, and Mirror Neurons

My suggestion is that knowledge of persons is model-like and that it is built up out of the map-like outputs of what are called “mirror neurons” and more traditionally recognized sensory processing areas. Social cognition is representational insofar as maps and models are representational, but, much like the maps and models we are familiar with, the representational medium in question is essentially bound up with know-how. I claim that the literature on mirror neurons provides a powerful motivation for an account of representing others in terms of models.⁴

Mirror neurons were discovered when an Italian lab demonstrated that one section of the monkey’s premotor cortex called “F5” had special properties (Matelli, Luppino, & Rizzolatti 1985; Rizzolatti, Camarda, Fogassi, Gentilucci, Luppino, & Matelli 1988). In one of the first experiments with mirror neurons, the brains of monkeys were monitored during a variety of circumstances involving picking up a small edible object (cf. Gallese, Fadiga, Fogassi, & Rizzolatti 1996). Scientists observed F5 while a monkey picked up the object but also observed F5 when the monkey watched a human or another monkey pick up the object. Interestingly, some neurons were active in all these circumstances. These neurons were not active when observing a human pick up an object with a tool, such as a pair of pliers. The neurons in question responded only to observed actions that closely resembled the way the monkey would act in the place of the other. The neurons “mirrored” an observed action within the watching monkey’s motor system (Fogassi & Gallese 2002, 16).

These experiments with gripping an object revealed an overlap between the motor and sensory systems of the monkey. What was noteworthy about this particular overlap was that it showed a motor process in another person could be immediately registered through an equivalent motor process in oneself. In fact, the monkey’s mirror neurons are sensitive to the goal of a visible action, and different mirror neurons can vary in how specific a combination of action and goal they track. For example, the monkey’s motor mirror neurons will fire if the monkey sees a hand reach behind a screen in the same manner as the monkey would if it had a clear line of sight on the grasping of the object behind the screen. They
will only fire in this manner, however, if the monkey has been previously exposed to a graspable object behind where the screen is placed. Visually identical actions of the other person seem to be implicitly recognized as different because of the different purposes of the actions (Umilta, Kohler, Gallese, Fogassi, Fadiga, Keysers, & Rizzolatti 2001). Mirroring effects in the monkey’s motor system have been found for grasping, manipulating, tearing, and holding objects as well as a variety of motions of the monkey’s mouth (cf. Ferrari, Gallese, Rizzolatti, & Fogassi 2003).

Since mirror neurons were discovered in monkeys, they have been found in human beings as well (cf. Rizzolatti & Craighero 2004; Rizzolatti, Craighero, & Fadiga 2002). Experiments showed as early as the nineteen fifties that the motor cortex in humans becomes active when a subject is observing an action done by another (Rizzolatti & Craighero 2004, 174). Much like the experiments with monkeys, human neurons register both select behaviors of others and equivalent activity within oneself.

Two of the functions in which researchers typically implicate human mirror neurons are action and goal understanding on the one hand and emotion understanding on the other hand (cf. Rizzolatti & Sinigaglia 2006, 124ff., 173ff.).

Monkey mirror neurons respond to observed behavior by mirroring an action-goal composite within the motor system. Human mirror neurons do the same, and, like monkey mirror neurons, individual mirror neurons can be very selective in regards to the actions and goals to which they respond. A much wider range of actions elicits mirror activity in the human brain compared to the monkey, however. Even “meaningless” actions can produce mirror activity in humans (Fadiga, Fogassi, Pavesi, & Rizzolatti 2002; Maeda, Kleiner-Fisman, & Pascual-Leone 2002; Strafella & Paus 2000).

Mirroring appears to be involved in emotion understanding and recognition as well. Research on disgust (cf. Wicker, Keysers, Plailly, Royet, Gallese, & Rizzolatti 2003), fear (cf. Sprengelmeyer, Young, Schroeder, Grossenbacher, Federlein, Buttnner, & Przuntek 1999), pain (cf. Singer, Seymur, O’Doherty, Kaube, Dolan, & Frith 2004), feelings of guilt (cf. Blair, Jones, Clark, & Smith 1997), and anger (cf. Lawrence, Calder, McGowan, & Grasby 2002) indicates that there are neural areas that are active both when one recognizes these states in others and when one expresses or experiences them. Furthermore, when one of the mirroring areas for an emotion is damaged, matching deficits emerge for the expression, experience, and recognition of that emotion.
Mirroring persons is a matter not only of translating sensory information into motor equivalents but also of integrating, refining, and schematizing the motor information that mirror neurons produce. This result should not be surprising given the way the sensory perception of objects works. When one perceives a cup, an initial presentation of various local features of the cup is necessary—colors, edges, orientations, luminosity, etc. These features have to be bound together into a single object lest one be left understanding a chair as a set of edges, orientations and colors and not as a one thing. In sensory perception, the inchoate understanding of how a field of local features might go together is often called “gist” by neurobiologists of attention (cf. Oliva 2005). One attempts to refine one’s understanding of the initial, bottom-up input until the inchoate has become clear enough given one’s purposes and capabilities.

Consider an analogy in terms of tuning in a radio station. One begins with an initial pass during which one hears a station briefly and confusedly. One guesses what the spot was on the dial that had that station and scans the area around that spot turning the knob more slowly on consecutive passes until the station’s signal is sufficiently clear. No matter what kind of tuning one is doing, when one tunes something in, one begins with a vague sense of what the target is and where it might be found within a sensory field. One then devotes one’s attention to a smaller and smaller part of the radio dial until one has tuned in the station one wants sufficiently for one’s purposes. The guiding of the dial (the “top-down” influence) and responsiveness to radio signals (the “bottom-up” process) must work in tandem to tune in the station. To the extent that one has experience tuning in stations, natural aptitude for tuning, or prior knowledge of the location of one’s station, one is put into a position to achieve greater clarity of signal in one’s tuning.

Similarly, when one first sees another person, one’s motor mirror neurons may register only the “gist” of their behavior. Continued observation allows one’s mirror neurons to refine one’s understanding of what one is looking at by extending the duration of observation. For example, having spilled some marinara sauce down his shirt, Charlie may look up at Suzanne to see her reaction. Charlie immediately finds himself experiencing Suzanne as a person who is looking at him, but her facial expression may at first seem indeterminate between smiling and smirking. With continued observation and Suzanne’s unfolding pattern of behavior over time, Charlie comes to experience Suzanne as smiling at him, not smirking. Both the fuzzy impression of Suzanne’s behavior and the more clear cut impression come to Charlie as intuitive insights into Suzanne, but a tuning process was necessary to get to that insight.
To the best of our knowledge, then, mirror neurons create map-like outputs of the other person’s motor behavior and perhaps the other’s emotional and attentional behavior as well. A subset of one’s motor system and possibly one’s emotional systems react to the presence of bodily movement in another person. The reaction elicited is an approximation of the neural behavior revealed by the pattern of the other’s behavior. Then, top-down influences, which may include one’s background information and practical interests, condition the manner in which one continues to process the movement of the other. Tuning in the mental state of the other person likely involves using a template of some sort to focus one’s further processing on features and patterns in the behavior of the other that are salient. The tuning process may also involve moving and interacting in a manner designed to give one a better sense of what the other person is thinking and feeling.

In the tuning facilitated by mirror neurons, one starts with a basic similarity between the motor and affective systems of oneself and the other, and one pursues a greater degree of similarity along certain lines that are selected for in the tuning process. One selects features based on the possible mental states of the other person suggested by one’s initial grasp of the other’s behavior coupled with one’s background knowledge and one’s practical interests. The mental states suggested by the behavior of the other person can include the goal-directedness of an action and what the other person is attending to.

The similarity cultivated between one’s own endogenous systems and those of the other is like an evolving map of the other person’s current mental state. One starts with something inchoate, something map-like that is primarily useful because it forms the basis for going about building a more useful map or model of the other person. One then looks for a match between the other’s behavior and specific features one is looking for. This process brings into focus some of the features of the other person’s behavior. Which features are brought into focus will be partly determined by the possible uses one might have for that information in one’s social context. For example, it is likely that one leaves one’s understanding of strangers at a fairly undeveloped level unless there is some indication that the stranger’s actions and affect may develop in a way that affects oneself (e.g., either a flirtatious or a hostile look).

One can think of the basic similarity of motor and affective systems as establishing a framework that can host other information much like the spatial similarity of a map can allow it to host information through the placement of symbols on the map. For example, if some motor state is associated with an attentional state, then perhaps the presence of that motor state in the map of the other can allow one to incorporate plausible candidates for the
object of attention into one’s map of the other’s behavior much like the placement of dots on a rail map allows that map to incorporate information on the location of rail stations.

There are a number of options for thinking about the way in which the output(s) of mindreading can be map-like. The simplest way to think about the relationship between the different types of information one gains about others is that there is a single map-like structure that hosts one’s other information about the other person. Perhaps one’s motor mirror neurons establish the basic similarity between self and the other in a way analogous to the spatial similarity of a map and all of one’s other information is analogous to symbols placed within the map.

Another possibility is that we develop more than one map—perhaps motor, emotional, and visual maps. These maps may overlay each other to create a master map much like one might combine separate maps of the rail system, roads, and footpaths of a location so as to form a master map. One could also think of know-how as replacing the need to overlay the distinct maps much like one might have three separate maps of the same area that one can use as if they were one map because one has the ability to use all of them individually and to cross-reference them when necessary.

If I am right to think about the output of individual mindreading episodes as being map-like or having significant map-like components, the next question is what one should think of one’s more general knowledge of other persons. When one knows that Harry is somewhat dyspeptic during tax season or that Amelia has a wry sense of humor, it is not as if there is some one motor or affective state to be mapped. Harry’s dyspepsia and Amelia’s comedic impulses are more general characteristics that can be manifested in a variety of ways. One expects there to be some relationship between the outputs of particular episodes of social interaction and whatever undergirds one’s general sense of another person. Experiences of another person should act as grounds for what another person is like, and one expects that one of the top-down influences that one brings to bear in tuning in another person is the way one has previously experienced him or her to be.

Whatever state allows one to count as having general knowledge of another person, then, has a two-way relationship with the map-like outputs of individual interactions. One’s general sense of another person shapes the manner in which one attempts to tune in the other person. It shapes the way in which one maps the other person, but it does so in light of the way one has previously mapped the person. Its content is partly determined by mappings, and it needs to be apt for directing further mappings.
A useful way of thinking about one’s general sense of a person is that it is model-like in a way parallel to the way episodes of interaction create map-like representations. As Giere pointed out, one can have more general models the purpose of which is to develop, apply, integrate, and evaluate more specific models or maps. The fit or lack of fit of the more specific models and maps with the more general model and with the world can cause one to adjust or reject the more general model or vice versa. The role of the more general model, however, is to embody a unitary understanding of a wide range of phenomena. An increase in generality for a model is often accompanied by an increase in abstraction due to the diversity in what the more general model must be similar to.

Thinking of one’s knowledge of persons as being registered in maps and models of the other person allows one to accommodate some of the concerns and insights of the enactivist. Mapping a domain is an active process in which practical interests loom large. It involves selecting for features of interest in the tuning process, and often it requires interacting with other persons and exploring one’s social environment to put one in a position for greater insight. Similarly, modeling the content of one’s mappings of others is an active process in which one must weigh one’s different experiences of another person and the various features of those experiences. The processes that allow one to have knowledge of persons are highly dependent on the know-how necessary to build up these maps and models and relate them to each other and to strategies of investigation.

Maps and models are of their very nature selective and partial. Often a map only succeeds in communicating the information it does by restricting its scope to the features deemed relevant. It should come as no surprise on this account that our mappings and models of others can leave a lot of information out, including information that would be obvious if we were looking for it. Attempting to explain mapping behavior in terms of propositional inferences is bound to over-intellectualize the pragmatic and embodied dimension of map-use and construction (or else make us out to be irrational for failing to tease out the logical implications of the overtly represented sentential items posited as the carrier of information). Explicit propositional reasoning can, of course, supplement mapping and modeling behavior. Nonetheless, it is not likely that one can reduce such behavior or the information that maps make available to propositional attitudes and reasoning.

On the account I am giving, modeling other persons is never solely a matter of sensory imagery. Rather, one correlates sensory imagery with maps and models of the other person’s endogenous states, including mental states of emotion, attention, and intention that may condition one’s pattern of behavior. Maps and models of the other person will lead one to have sensorimotor expectations concerning how an interaction with the other person
should or could unfold. Possessing maps and models of one’s social environment grounds one’s social instincts. Social cognition, however, is more than a mere reflex or instinct. It is the ability to navigate the world by building up a sense of how things stand out there in the world of persons relative to our practical interests. That project is hard to make sense of, however, without an appeal to something representational.

In conclusion, though enactivism should draw our attention to the role of activity, interaction, and know-how in the knowledge of persons, there should be nothing suspect in speaking of social cognition in representational terms. It is plausible, based on our current state of empirical knowledge, that social cognition produces map-like and model-like outputs. Plausibly, coming to know another person is not a matter of merely learning to react to behavior in a reflexive manner; it is gradually developing a more insightful and useful model of who the other person is.

References


Rizzolatti, Giacomo, Rosolino Camarda, Leonardo Fogassi, Maurizio Gentilucci, Giuseppe Luppino, and Massimo Matelli. “Functional Organization of Inferior Area 6 in the Macaque


Notes

1 For good book-length presentations of some other enactivist perspectives, see also Gallagher 2005 and Noe 2006.

2 Hutto’s own preference is to focus on the phrase “folk psychology”, but he uses “mindreading” as something equivalent to employing folk psychology throughout his book. In the preface alone, see the uses of mindreading on pp, ix, xiii, xiv, xv, xvi, and xvii.

3 “I . . . provide a detailed account of intentional attitudes in terms of a thoroughly noncognitivist, nonrepresentationalist understanding intentionality—one that regards embodied, enactive modes of responding as basic and sees symbolic thinking as the preserve of those beings that have appropriately mastered certain sophisticated linguistic constructions and practices. This matters because only those that have achieved the latter are in a position to have and to understand bona fide propositional attitudes” (Hutto 2008, xiii). Notice that Hutto runs together representations, propositional attitudes, and language.

4 It is worth pointing out, however, that one could have an account of mindreading rooted in a hierarchy of map-like and model-like information structures while being skeptical about the role that mirror neurons play.