A Pluralist Approach to Merleau-Pontian Cognitive Science

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Abstract: Representational and embodied approaches to cognitive science are often presented in opposition to one another, with Merleau-Ponty serving as a historical precursor to embodied approaches. We argue that the two approaches to Merleau-Ponty are compatible and complementary, both with each other and with Husserlian approaches to phenomenology. To support our arguments, we describe two forms of representation associated with two distinct processes. Motor intentionality is a process of direct embodied interaction (reflexes, habits, skilled behaviors) which use mediating representation to bind sensory information together and guide behavior. These internal states reliably indicate specific stimuli (even if just during a transient episode), are associated with a determinate phenomenal character (a "typical physiognomy"), and correspond to what Husserl describes as passive synthesis. Higher-level processes like reasoning make use of more explicit representations (what Husserl calls active processes), which are associated with focused attention and "explicated" propositional contents. The two kind of process can occur independently, but are often fully woven together, as for example when a friend makes explicit suggestions while the two of you cook.We also discuss Merleau-Ponty's famous Schneider case, which makes vivid what happens when both types of process (motor intentionality and high level reasoning; passive and active synthesis) are intact, but when some explicit representations are damaged. A certain stratum of virtual or projected space is lost, and so a certain kind of abstractly guided behavior is unavailable to him.

Introduction

When tying our shoes or walking up a flight of stairs or making dinner, what role do abstract, symbolic representations play? Classical approaches to cognitive science hold that internal models and representations play a central role in all activities, including these, while anti-representationalists argue that most human behavior emerges from direct interaction between the body and its environment, without the need for internal representations. Merleau-Ponty is often associated with the anti-representationalist side of this division. In *Phenomenology of Perception*, Merleau-Ponty argues that human behavior and cognition arise from "motor intentionality", a human relationship with the world unmediated by explicit representations. Merleau-Ponty supports his approach with the case of Schneider, a brain-injured veteran of World War 1 who was able to perform concrete behaviors such as blowing his nose or scratching a mosquito bite despite being unable to perform abstract actions like drawing a circle in the air.

We describe an approach to the issue that combines the best features of embodied and classical accounts (cf. Yoshimi, 2023; Yoshimi, 2012). The approach is informed both by phenomenology and cognitive science, and is thus a kind of neurophenomenology or naturalized phenomenology (Varela, 1996; Petitot *et al*., 1999; Zahavi, 2004; Yoshimi, 2016).[1] We distinguish two kinds of representations. First, orienting and binding representations, which are present even in embodied and concrete activities and provide a form of implicit spatial awareness that guides behavior at a basic level. Second, high-level representations, which are present in explicit, attentive, and propositionally-structured thought and language-use. We argue that motor intentionality requires the first but not the second kind of representation.

We first describe our general pluralist approach to the interpretation of Merleau-Ponty, then the application to the case of Schneider. In a final section we extend our arguments to Husserl, who developed a dual-systems approach to belief that dovetails nicely with our account of Merleau-Ponty. The result is an approach to neurophenomenology that is both Husserlian and Merleau-Pontian, and that combines the best features of embodied and classical cognitive science. One upshot of the paper is that we see across these cases how automatic skills and explicit representational processes are not just compatible but complementary.[2]

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[1] In the tradition of naturalized phenomenology, we draw on behavioral, neural and computational evidence in developing our phenomenological claims. We draw both on traditional approaches to cognitive neuroscience which attribute rough functions to areas and circuits in the brain, but we recognize this kind of approach as limited given the extreme interconnectedness and holistic entanglement of the brain (Sporns 2016; Pessoa, 2022).

[2] An area where this idea has been especially well-worked out is in the study of skilled behavior, where a series of debates have occurred that originate in many of the same sources that are discussed here, especially Hubert Dreyfus' work (for a helpful overview that defends several forms of pluralism similar to the pluralism defended here, see Dayer and Jennings, 2021). One camp in this debate consists of habitualists like Dreyfus , "those who focus on the automaticity of skilled behavior." Another consists of "those who focus on the higher-level cognition behind peak performance, the 'intellectualists.'" There is now considerable support for the idea that both groups have something right, and that attentional control and automated skill work together in expert performance (Dayer and Jennings, 2021; Toner and Moran, 2021). Examples discussed by these authors include a tennis player running and making shots but also adjusting their high level strategy, and an expert knitter switching between automated routines and executive control during "difficult stitches" and "yarn changes".

1. Merleau-Ponty, Motor Intentionality, and Representation

1.1 Motor Intentionality

Merleau-Ponty developed his phenomenological views in reaction to more traditional approaches to mind, which he grouped into two broad classes, "empiricism" and "intellectualism". The first emphasizes sensory stimuli and simple sensory experience; the second emphasizes abstract internal rules and symbolic patterns mediating behavior. Both tendencies continue in various forms today. Empiricism persists in neural network approaches which emphasize how human abilities are acquired via extensive training using empirical data (Rumelhart and McClelland, 1986; Buckner, 2024; Yoshimi *et al.*, 2024). Rationalism persists in approaches to cognitive science which emphasize the existence of innate representational capacities that are at the basis of thought and language (Fodor, 1975; Fodor, 2008; Rescorla, 2020).[3]

Against intellectualism, Merleau-Ponty argues that no bodily behavior can consist of a representational content independent of the subject and its movements (Merleau-Ponty, 2005, p. 138). Consciousness "knows the object" through the body rather than relying on any kind of symbolic, objectifying representation. Merleau-Ponty describes these kinds of interaction as forms of "motor intentionality", that is, skills and habits that allow the body to interact with the world in a direct way without deliberate thinking, planning or awareness. In Merleau-Ponty's words: "Consciousness is in the first place not a matter of 'we think that' but of 'we can' [...] Sight and movement are specific ways of entering into relationship with objects [...] not by placing them all under the control of an 'we think', but by guiding them towards the intersensory unity of a 'world'" (Merleau-Ponty, 2005, p. 159). Motor intentionality includes a wide range of behaviors, including reflexive behaviors like quickly

[3] Merleau-Ponty criticizes empiricism for regarding perception as a kind of blind, passive stimulus-response process that "does not know what it is looking for." He criticizes intellectualism for an over-reliance on internal symbolic processes, when in fact the external world is a rich source of meaning. As he says, "Empiricism cannot see that we need to know what we are looking for, otherwise we would not be looking for it, and intellectualism fails to see that we need to be ignorant of what we are looking for, or equally again we should not be searching" (Merleau-Ponty, 2005, p. 33). We agree with these critiques but, in the spirit of pluralism, also incorporate what is best in contemporary elaborations of both traditions.

pulling our hand away from a hot surface or swatting an insect bite, well-practiced skills that allow us to play a musical instrument or type on a keyboard without thinking about the location of the keys, driving a car or bicycle, climbing stairs without realizing how often we need to take a step, moving through a door without thinking about whether we will fit through it, or any other task that we do without paying full attention.

We take motor intentionality to be subserved by sensori-motor circuits that occur in all animals, including insects and even bacteria (Hotton and Yoshimi, 2024, ch. 8). In humans motor intentionality is associated in part with the dorsal visual stream, the "where and how" pathway, a cortical circuit supporting visually guided reaching and grasping based on continuous analysis of the spatial position, shape and orientation of objects (Hebart and Hesselman, 2012, p. 8017; Creem and Proffitt, 2001; Goodale and Milner, 1992), which enables us to grasp objects and adjust our movements without deliberative attention. The dorsal stream is contrasted with a ventral stream, also known as the "what" pathway, which supports object recognition, face recognition, categorizing objects, and identifying differences between visual details. It processes detailed visual information to help identify objects, shapes, colors and complex patterns. There is evidence (reviewed below) that damage to it can impact certain forms of explicit recognitional capacity while leaving related forms of motor intentionality intact.[4]

1.2 Two Kinds of Representation

Merleau-Ponty's account of motor intentionality is suggestive of an anti-representational approach to cognitive science, since it describes how meaningful behavior is possible without the meditation of explicit conscious representations (Dreyfus and Dreyfus, 1999; Dreyfus, 2002). However, do the everyday behaviors listed above really exclude representational processes altogether? We believe the answer depends on what you mean by "representation". We will work with two concepts. Both are coarse grained, and could be broken down into further sub-categories. Both are informed by a range of empirical

[4] Goodale and Milner's "what" system processes object characteristics for long-lasting representations using multiple frames of reference, whereas the "how" system transforms visual information using an egocentric frame of reference in preparation for direct action" (Creem and Proffit, 2001, p. 43).

and neurological considerations, but can also have a phenomenological component. There are other conceptions of representation beyond the ones we present, each with its own domain of application, but these are most relevant to this study.

Orienting and binding representations: These are neural states that bind multiple sensory contents together, where the resulting state is then used to guide behavior. They are reliably re-activated in the presence of similar stimuli, and are thus indicators of the presence of some environmental condition. In humans, they are accompanied by an implicit sense of doing certain things, like “swatting my arm” or “turning on the car”, which have a specific, repeatable phenomenal character. These representations may occur without attention and may not always be reportable. Representation in this sense is a kind of amalgam of several existing conceptions, including those of Dretske, Markman, and Dietrich (Hotton and Yoshimi, 2024, ch. 4).

High-level or explicit representations: These are psychological states that have an explicit propositional structure, and that are associated with focused attention. These states are mediated by higher-level executive systems and distributed language systems in the brain. They are associated with a phenomenology of explicit thought and language, for example, having the actual thought that “there is a fly on my arm” or “I should turn on the car now”, and perhaps even saying these things out loud. Here again we have an amalgam of existing ideas and repeat that the concept is coarse grained and could ultimately be decomposed into several dissociable components such as attention and propositional structure. In the literature, what we call “high-level representations” are associated with access consciousness, i.e. states poised for rational control of action and available for verbal report (Block, 1995) and with the early “cognitive” stages of a learning a skill when tasks must be decomposed into context free features and rules (Dreyfus and Dreyfus; Posner and Fitts). They have formal language-like properties associated with representations in the classical sense of Chomsky, Fodor, and Pylyshyn (Chomsky, 1980; Fodor and Pylyshyn, 1988). Such representations are essential to learning via guided instruction, reasoning, inner thought, communicating, explicit decision-making, and many other activities that are distinctive of higher cognition in humans and some other complex organisms.

Two qualifications before moving on. (1) These two types of representations are, as we conceive them, neural structures or states that occur in two corresponding types of *process*: processes like navigation and orientation and skill execution in the case of orienting and binding representations (i.e. motor intentionality), and processes like reasoning, mind wandering, reporting and deliberating in the case of high-level representations. That is, each kind of representation involves a state that is characteristically involved in a broader process. (2) Some states may occur in both kinds of process, and thus function as both kinds of representation, depending on context. For example a state that supports an automatic or habitual process at one time might later participate in a high-level explicit thought process.

1.3 Motor Intentionality and Explicit Representations

Merleau-Ponty makes a convincing case that motor intentionality can occur without explicit representations. We can swat away a fly or walk up a flight of stairs without giving it the least bit of thought, and without saying a word. The vast majority of our engagement with the world is guided not by explicit thoughts but by automatic and pre-reflective forms of interaction. Examples include passing through a door without comparing the width of the door to our own width, typing without thinking about the placement of each letter on the keyboard, and reaching and grabbing objects like cups and phones. Phenomena like these are the basis of Dreyfus' interpretation of Merleau-Ponty as a precursor to embodied and anti-representational forms of phenomenology and cognitive science.

Merleau-Ponty describes these habits as a kind of "knowledge in the body", for example, "knowledge in the hands":

> It is possible to know how to type without being able to say where the letters which make the words are to be found on the banks of keys. To know how to type is not, then, to know the place of each letter among the keys, nor even to have acquired a conditioned reflex for each one, which is set in motion by the letter as it comes before our eye. If habit is neither a form of knowledge nor an involuntary action, what then is it? It is knowledge in the hands, which is forthcoming only when bodily effort is made, and cannot be formulated in detachment from that effort. The subject knows where the letters are on the typewriter as we know where one of our limbs is, through a knowledge bred of familiarity which does not give us a position in objective space (Merleau-Ponty, 2005, p. 166).

Of course, motor intentionality does preclude the existence of explicit representations. Consider a person reaching for a cup of coffee while reading a book. She picks it up and drinks it without paying any attention to it. But suppose she hits the cup, spilling coffee on the counter. Now her full attention is focused on the cup. She might get angry because the coffee spilled and all of her papers got wet. She may wonder why he was so careless. Or suppose she drops and breaks the cup. She may remember how much she loved the cup and that it was a gift from her best friend. Some of these are cases of what Dreyfus (Dreyfus, 1991) calls "breakdown", where an entity that was simply being used stops functioning properly and thus becomes an object of focal interest (in Heideggerean parlance, they go from being "ready-to-hand" to being "present-at-hand"). Such cases need not be momentary. A habitual action can be interrupted and give rise to an extended train of theoretical contemplation, in which a series of explicit representations are entertained.

But even this kind of "mode shifting" after "breakdown" is by no means the only way motor intentionality and explicit representations interact. Explicit representations happen all the time in daily life, and are part of what separates animals with higher cognition from simpler organisms. All through the day we are asked to do things, our attention is focused on things, we change what we are doing, we stop for a moment and think or talk about something, etc. For example, when two people make dinner together, they constantly ask each other questions and direct each other's attention, even in the midst of a whole array of habitual and skillful interactions. One person might ask the other to chop things, get things from the pantry, add more salt, taste the sauce, etc. These can be thought of as explicit representations entering into and intertwining with motor intentionality, guiding us to do specific things, to change our course of actions, to reflect for a moment on a behavior, etc. This suggests a deep complementarity between motor intentionality and explicit representations. We can certainly do many things without explicit representations, but the explicit representations are not some kind of rare occurrence or problematic mode, they are completely woven into our daily existence.

1.4 Motor Intentionality and Orienting and Binding Representations

So motor intentionality can occur with or without explicit representations. But can it occur without orienting and binding representations? Suppose a healthy person reaches for a glass without thinking about it. This is not a chaotic movement. A very specific set of behaviors must unfold that integrates and coordinates multiple streams of sensory-motor information, not in a rigidly-conditioned way, but in a context-sensitive way that is responsive to the overall demands of the situation (Newen and Vosgerau, 2020). Recall Merleau-Ponty's discussion of typing: "To know how to type is not.. to know the place of each letter among the keys, nor even to have acquired a conditioned reflex for each one" (p. 166). Automatic but context-senstive action was used as the opening example in the famous PPD volumes (Rummelhart and McClelland, 1986), which arguably launched connectionism as a major paradigm of cognitive science. Here is how the authors describe the process of reaching and grasping:

> Hundreds of times each day we reach for things. We nearly never think about these acts of reaching. And yet, each time, a large number of different considerations appear to jointly determine exactly how we will reach for the object. The position of the object, our posture at the time, what else we may also be holding, the size, shape, and anticipated weight of the object, any obstacles that may be in the way-all of these factors jointly determine the exact method we will use for reaching and grasping.

The PDP authors are describing the many ways such a process can be modulated in different contexts, and how a neural network can optimize with respect to multiple constraints in an on-line and responsive way, without the mediation of higher cognition.

Neural networks like these do not use explicit representations but do make use of orienting and binding representations. To make the point we can consider extremely simple neural circuits, for example, Braitenberg vehicles (Braitenberg, 1984; Hotton and Yoshimi, 2024). Such a vehicle can be modeled as a circuit involving two sensors and a single motor (Figure 1). Pairs of these vehicles can behave in incredibly complex and situation-responsive ways, thanks to their interactions, without the meditation of any internal control systems. All of this is fully compatible with how motor intentionality functions. And yet the process also involves orienting and binding representation. Each agent's sensors track the location of the other agent in a systematic way and these representations are key to explaining how the many behaviors of a Braitenberg vehicle unfold. For example, when they circle around each other, each agent orients itself by a stable representation of roughly this form: “the other agent is to my right so I will follow it to the right”. Many other behaviors are possible for this type of system, including side-by-side motion and complex revolving and translating “meanders” with many “petals”. In each case orienting and binding representations play a central role.

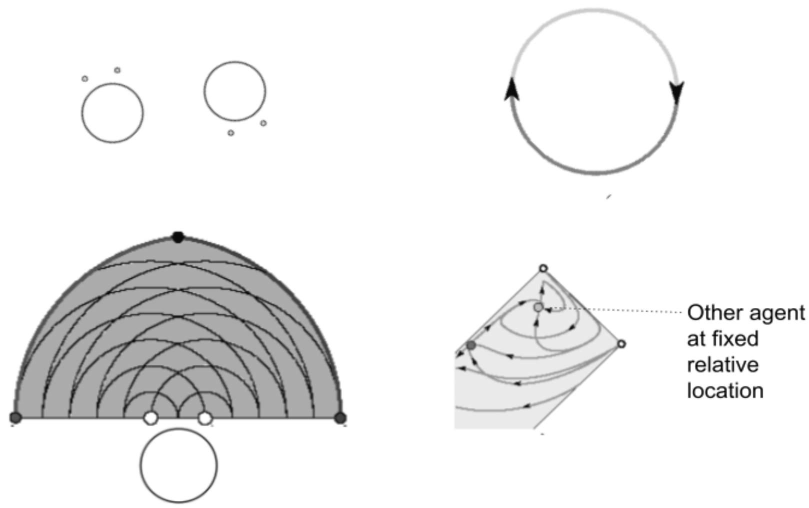

Figure 1: (Top left) two Braitenberg vehicles configured in such a way that they revolve around each other repeatedly. Each vehicle has two neurons connected to a single motor by two weights, i.e. a simple neural network. (Top right) the physical path the vehicles pursue in this configuration. (Bottom left) the field of view for one vehicle. When the other vehicle is on any of the arcs within this field of view the corresponding sensor will fire at a specific value. The intersection of two arcs corresponds to a pattern of sensory activity that represents the location of the other vehicle. So we have a system of orienting and binding representations. (Bottom right). An alternative depiction of this system of representations, in the context of a dynamical systems explanation which shows how, in this situation of revolving around each other, each agent settles into an attracting sensor state which represents the other agent as being at a specific location in its frame of reference.

In humans, matters are more complicated, but the same general idea applies. A person can do routine things without much thought, but in a context sensitive way, and it’s plausible that orienting and binding representations play a mediating role. Moreover, these processes are associated with a specific, repeatable phenomenology. When reaching for a cup it feels like reaching for a cup, and when walking up stairs it feels like walking up stairs, and this is plausibly because similar sensor-motor processes occuring in the brain when we enact these behaviors. Merleau-Ponty himself refers to “a typical or familiar physiognomy”:

> When I run my eyes over the text set before me, there do not occur perceptions which stir up [explicit] representations, but patterns are formed as I look, and these are endowed with a typical or familiar physiognomy. When I sit at my typewriter, a motor space opens up beneath my hands, in which I am about to ‘play’ what I have read. The reading of the word is a modulation of visible space, the performance of the movement is a modulation of manual space, and the whole question is how a certain physiognomy of ‘visual’ patterns can evoke a certain type of motor response, how each ‘visual’ structure eventually provides itself with its mobile essence without there being any need to spell the word or specify the movement in detail in order to translate one into the other (Merleau-Ponty, 2005, p. 167).

These visual and manual patterns and their typical or familiar physiognomy is, we claim, based on the repeatable evocation of sensori-motor circuits in the brain that can be understood as orienting and binding representations.

An important objection should be addressed before moving on. Recent experiments and computational models have demonstrated a phenomenon known as “representational drift”, which calls into question whether stable repeatable behaviors are involved in the kinds of behaviors we have been describing (Driscoll *et al*., 2022; Rule *et al.*, 2019; Wirt *et al.*, 2024). Across multiple experiments and organisms it has been shown that “the neural activity patterns correlated with sensation, cognition, and action often are not stable and instead undergo large scale changes over days and weeks” (Driscoll *et al*., 2022). Computational models provide further support for representational drift, by showing how a neural network can self-assemble dynamically in response to a situation in such a way as to support stable behavior, but without relying on a persistent internal representation. In a model due to (Falandays *et al*., 2024), an agent learns to track a moving object, to avoid walls, and to play the video game Pong at above chance levels. In any given context it self-assembles its neurons to achieve a desired end, but it uses different neurons in different ways each time, which speaks against the idea of a permanently encoded set of internal representations. Still, in any given context in which it has assembled itself in a particular way, it uses those same patterns in the same way repeatedly.

We have two responses to this objection. First, there is no reason to think drift is universal. Many circuits in the brain are persistent over long periods, and in fact unlike most cells of the body, the brain "is mostly post-mitotic and thus largely relies on the same set of neurons throughout life" (Chambers and Rumpel, 2017, p. 172). With improved imaging techniques brain cells have been observed to be more dynamic than previously thought, but it is still that case that regulatory mechanisms maintain overall stability in these circuits (Chambers and Rumpel, 2017), for example producing reliable dynamical behaviors on a time-scale of years (Gallego *et al.*, 2020). Second, even in cases where drift obtains, *transient* orienting and binding representations occur. In such cases the representations only last as long as a particular activity unfolds, before the synaptic machinery underlying the behavior "drifts" and reassembles. This could still be enough to support an emergent experience of "the kind of thing that happens" when doing something, like changing direction or undergoing a pattern of movement to achieve some goal.

2. Application to Schneider

2.1 Background on Schneider

Schneider was a soldier who suffered a traumatic brain injury at the age of 24 from blows to the skull and occipital lobe during the First World War. After a period of unconscious coma, "he was transferred to the brain injury department of the military hospital in Frankfurt for rehabilitation. There he learned the profession of a 'porte-feuiller' manufacturing wallets and pencil cases from pieces of leather. He had some difficulties in the beginning but soon mastered the job and worked very precisely, albeit slowly" (Goldenberg, 2003). At Frankfurt he underwent a long period of rehabilitation under the supervision of neurologist Kurt Goldstein and Gestalt psychologist Adhémar Gelb. Schneider lived a relatively normal life during his rehabilitation (Gelb and Goldstein, 1918, p. 9). For example, if he wanted to go home, he went home, if he wanted to turn on the lamp, he did so. However, when he went out on an errand, even if he passed by Goldstein's house, he could not recognize it because he had not left the house with the intention of going to his house (Merleau-Ponty, 2005, p. 155). He could not comb his hair, or give the soldier's salute. In order to perform these behaviors, he had to imagine himself as if he were in his bedroom combing his hair or in a parade.

Contemporary scholars have diagnosed Schneider's condition as a form of visual agnosia, though the details are controversial.[5] We follow (Farah, 2004) in referring to Schneider's condition as visual form agnosia. Visual form agnosia is a neurological disorder in which a patient has intact vision but is unable to visually identify objects. It has been described as an ability to "see but not see", (Humphreys and Riddochor, 1987) and as "preserved stuff vision in the absence of thing vision" (Farah, 2004, p. 17). The condition is rare and corresponds to an "extremely heterogeneous" set of patients (Farah, 2004, p. 11). In fact Schneider is one of just a handful of documented cases. Visual form agnosia is often accompanied by intact cognitive abilities. Thus the impairment lies somewhere between low-level vision and high-level intellect, in a person's ability to recognize visual forms and shapes. Patients are typically quite good at compensating, for example identifying objects based on inferences from other features: "Patient's identifications of objects are typically *inferences*, made by piecing together color, size, texture and reflectance clues" (Farah 2004, p. 15).

Schneider is often described as having an intact ability to perform "concrete actions" or behaviors, and a diminished ability to perform some "abstract actions" or behaviors, and Merleau-Ponty is well-known for his rich, metaphorical elaboration of the presumed phenomenology of the two types of actions. Concrete actions are habitual actions that are necessary for life (Merleau-Ponty, 2005, pp. 120-121), that occur "in the realm of being or of the actual" (Merleau-Ponty, 2005, p. 128). Schneider had no problem with these familiar behaviors and routines. He was able to comprehend a concrete situation in its practical context (Dillon, 1988, p. 132). As a leather craftsman, he could change the task of cutting a

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[5] Gelb and Goldstein and their colleagues in the 1920s originally described his condition as a psychic blindness (Gelb and Goldstein, 19; 48). Farah classifies the case of Schneider as a case of apperceptive agnosia in the narrow sense that she, along with Benson and Greenberg, terms "visual form agnosia" (Farah 2004, p. 13). Marotta and Behrmann suggest interpreting the case as a case of what Riddoch and Humphrey calls 'integrative agnosia' (Marotta and Behrmann 2004, p. 636); a notion Farah critiques under the heading of 'associative visual agnosia' (Farah 2004, pp. 78–82). It is also worth noting that Schneider himself is a controversial figure, insofar as some have alleged that he faked his symptoms, learning to do what Gelb and Goldstein wanted as ably as he learned to be a portfeuiller (the debate about Schneider is nicely summarized in Goldenberg, 2003). For example, "Bay and Jung noted repeatedly that he produced visual symptoms when he suspected observation by critical examiners, but not when believing he was unobserved" (Goldenberg, 2003, p. 294).

wallet into the task of sewing it. He could quickly reach the point where the mosquito bit him. Here is a list of some of the concrete actions he was observed making:

Some Things Schneider Could Do (“Concrete Actions”)
Wiping a runny nose (Goldstein, 1923, p. 158)
Scratching where the mosquito has bitten (Merleau-Ponty, 2005, p. 90)
Reaching for an object, grasping it (Goldstein, 1923, p. 173)
Being able to sew a wallet because he is a leather master (Jensen, 2009, p. 3)
Turning on the lamp, going home from work (Jackson, 2017, p. 5)

Indeed, he has been described as having a lively and active social life, married and raised children, ran a grocery story, and was even elected mayor of his small town (Goldenberg, 2003, p. 294).

On the other hand, abstract actions are “actions that are not directed towards any real situation” (Merleau-Ponty, 2005, p. 120). Such an action “carves out.. a zone of reflection and subjectivity; it superimposes upon physical space a virtual or human space” (Merleau-Ponty, 2005, p. 128). Merelau-Ponty describes this superimposed virtual space as a “‘projection’ in which what does not naturally exist may take on a semblance of existence (Merleau-Ponty, 2005, p. 128). Schneider often failed to perform actions in this virtual or projected space. For example, he could not draw according to a model, and he had difficulty with pantomime. Here is a list of documented failures:

Some Things Schneider Could not Do (“Abstract actions”)
Pointing to his nose (Goldstein, 1923, pp. 157-159)
Drawing a circle in the air (Goldstein, 1923, pp. 157-159)
Pretending to give a military salute (Mooney, 2011, p. 362)
Pretending to comb his hair (Mooney, 2011, p. 362)
Describing the position of his limbs (Halák, 2023, p. 377)

Understanding metaphors such as “the chair leg” or “'the head of a nail” (Merleau-Ponty, 2005, p.147)
Understanding analogies like “light is to lamp as heat is to stove”, or “eye is to light and color as ear is to sounds” (Merleau-Ponty, 2005, p.147)
Drawing from a model (Merleau-Ponty, 2005, p. 152)
Describing a drawing of a butterfly shown to him as black, curved dots, but express the butterfly shape (Jackson, 2017, p. 5)
Grasping the story told to him as a whole in a flow (Merleau-Ponty, 2005, p.153)
Being sexually aroused by an image (Merleau-Ponty, 2005, pp.179-180)
Recognizing Goldstein when passing his house, unless intending to visit him (Merleau-Ponty, 2005, p.157)
Distinguishing two points of contact without additional motor exploration (Merleau-Ponty, 2012, p. 105)
Recognizing any object just by looking at it (Merleau-Ponty, 2005, p.130)

2.2 Schneider has motor intentionality

Schneider’s motor intentionality is clearly intact insofar as concrete actions like those listed above are skilled actions that fit our definition. He could swat away a mosquito and blow his nose and in general do habitual things that are associated with ingrained visuo-motor skills. As we saw, he was an accomplished leather-worker, who could sew a wallet, thread a needle, etc. He had no problem with everyday tasks such as combing his hair in the bedroom, turning off the light, or grasping objects. He ran a store and was even mayor of his town, activities which obviously involved a great deal of motor intentionality.

We have argued that concrete behaviors involve orienting and binding representation, and if we’re right, this applies to Schneider. That is, neural structures in Schneider’s brain tracking and sensory information functioned in real-time as representations orienting his motor behaviors, without requiring any attention or detailed conceptual processing. Thus neural structures responsive to pieces of leather, mosquito bites, his nose, his hair, the light switch, and cups of water activated specific motor behaviors in systematic albeit context sensitive ways, in much the way the PDP research group described reaching and grasping movements, and consistently with the way the sensors of a Braitenberg vehicles orient and guide them in their various embodied and interactive behavioral profiles.

2.3 Some explicit representations are lacking in Schneider

So, what is lacking in Schneider? Not motor intentionality. Not explicit representations altogether (more on this in section 2.4). Rather, what is missing is *some subset of explicit representations*, in particular those that work in concert with motor intentionality while he performed abstract actions. Thus what Merleau-Ponty describes as a "zone of significance" or "projection" or "virtual space" normally available to us for coordinating our behavior in a more abstract way--in response to explicit requests, in an effort to pantomime, etc.--is no longer available. When someone asks Schneider to point to his nose, he doesn't know exactly where his nose is and so he can't point. He can't guide his behavior using this kind of abstracted representation.

As long as he can stay in the world and in practical affairs Schendier is fine. What he cannot do is detach himself from that world and guide himself by certain explicit representations. As Merleau-Ponty says, there is a deficiency in the link between his sensitivity to abstract features of the object and required actions His case "shows deficiencies affecting the junction of sensitivity and significance" (Merleau-Ponty, 2005, p. 151). However, Schneider can rely on his intact conceptual abilities and higher cognition to inferentially piece together what he is seeing (recall that this is characteristic of visual form agnosia). To remember that an object shown to him is a pen, Schneider focuses on low-level visual features available to him and also on concrete uses of the pen, for example touching his breast pocket:

> If a fountain pen is shown to the patient, in such a way that the clip is not seen, the phases of recognition are as follows. 'It is black, blue and shiny,' says the patient. 'There is a white patch on it, and it is rather long; it has the shape of a stick. It may be some sort of instrument. It shines and reflects light. It could also be a coloured glass.' The pen is then brought closer and the clip is turned towards the patient. He goes on: 'It must be a pencil or a fountain pen.' (He touches his breast pocket). 'It is put there, to make notes with.' (Merleau-Ponty, 2005, p. 151).

What is made conspicuous by its absence here is a specific abstract representation of pen. Schneider cannot find the object via its abstract description. With that gone, he must rely on simpler concepts such as black and blue and shiny and stick-shaped, and also its concrete usage, and in this way zero in on what the object is.

This is all consistent with a diagnosis of visual form agnosia. The ventral stream from occipital to inferotemporal cortex is associated with representations of objects, such as faces and household objects. Damage to these areas produces well-known patterns of impairment similar to Schenider's. Explicit representations encoded in these object recognition circuits are no longer available. Motor intentionality, which is encoded throughout the brain but especially in the dorsal stream from occipital to parietal cortex, is intact.

2.4 Schneider has Conceptual Abilities

Even if some abstract representations are lacking in Schneider, he does have conceptual abilities. He can pursue deep investigations; he can think about objects and conceptually analyze them. He has political and religious views, an engaging personality, and was a well-known member of his community. As seen above, in the process of recognizing what an object is, his answers are slow but not meaningless. He understands what the doctor is asking and responds by thinking about it. Thus whatever is impaired in Schneider, it is not conceptual or higher level capacities of abstraction in general.

For example, although he cannot perform abstract behaviors such as drawing a circle in the air, he is aware of what a circle is and of what it mens to draw an object in the air. Again, visual form agnosics are often quite good at inferential compensation for their deficits. Schneider was able to perform many behaviors such as recognizing objects through inferences, combining their different qualities, or gradually reconstructing a drawing by following signs that imply a pre-existing concept (Halák, 2023, p. 376-378). Here is a list:

What Schneider Could Do Based on High-level Representations

Thinking or conceptual analysis on the object (Merleau-Ponty, 2005, p. 147)
Remembering previous habits (Halák, 2023, pp. 376-378)
Using verbal knowledge (Halák, 2023, pp. 376-378)
Understanding that words like eye, ear are related to sense organs (Merleau-Ponty, 2005, p.148)
Understanding the examiner's instructions (Merleau-Ponty, 2005, p.135)
Having political and religious beliefs (Merleau-Ponty, 2005, p. 155)
Performing simple math operations such as subtraction and division using fingers (Merleau-Ponty, 2005, p.135)

However, Schneider did struggle with analogies, in a way that highlights the distinction between explicit and what might be called originary or concrete use of explicit representations. According to Merleau-Ponty, Schneider cannot use certain kinds of analogies or reasoning in a direct, embodied way, but must apply them in the traditional manner of a logician, by (for example) "explicit subsumption":

> What impairs thought in Schneider's case is not that he is incapable of perceiving concrete data as specimens of a unique eidos, or of subsuming them under some category, but on the contrary, that he can relate them only by a quite explicit subsumption (Merleau-Ponty, 2005, p. 147).

What he struggles with is making immediate use of explicit representations in, for example, analogies and metaphors:

> It is noticeable, for example, that the patient does not understand even such simple analogies as: 'fur is to cat as plumage is to bird', or 'light is to lamp as heat is to stove', or 'eye is to light and colour as ear is to sounds'. In the same way he cannot understand, in their metaphorical sense, such common expressions as 'the chair leg' or 'the head of a nail', although he knows what part of the object is indicated by these words (Merleau-Ponty, 2005, p. 147).

In a way Schneider was forced to be a kind of caricature of a philosopher or scientist, explicitly analyzing things that most people can instantly understand: "It is easier for the normal subject to understand the analogy than to analyse it, whereas the patient manages to understand only when he has made it explicit by recourse to conceptual analysis

(Merleau-Ponty, 2005, p. 147). Schneider can find the truth by checking and questioning the facts put in front of him. The doctor's conceptual analysis from 'long' to 'stick-shaped', from 'stick' to 'tool' and from there to 'tool for writing things down' and finally to 'fountain pen' led him to the right conclusion. What is missing is the kind of automatic and complementary relation between explicit representations and motor intentionality described at the end of section 1.3, where we do things both concretely and abstractly throughout extended periods, reacting to abstract requests, using all kinds of metaphors, referring to things in terms of abstract categories, etc. This may explain why, though he was extremely adept at compensatory behavior, especially over time (a phenomenon documented both in Schneider's case and other cases[6]), he was still relatively slow and impaired compared to normal subjects, and even late in life received an extension on his pension for "mindblindness and traumatic cerebral weakness" (Goldenberg, 2003, p. 294).

3. Husserl on Passive and Active Synthesis

Our focus in this paper has been on Merleau-Ponty and embodied cognitive science, and how representational and anti-representational approaches are not just compatible but complementary. In this section we show how this work can be extended and integrated with Husserlian phenomenology.

Merleau-Ponty is sometimes presented as being at odds with Husserl, as for example in Dreyfus' well-known reading (Dreyfus, 2000; Dreyfus, 2002; Dreyfus, 2005). On this account, Husserl was a representationalist, and Heidegger and Merleau-Ponty were precursors to non-representational and embodied cognitive science. However, more recent research has emphasized continuity between Husserl and Merleau-Ponty (Muller, 2023, p. 126), and indeed there is evidence that Merleau-Ponty thought of himself as continuing Husserl's research. He was, for example, the first person to make use of the Husserl archives when they opened after the war (Van Breda, 1992).

[6] "It is possible that the patient [Schneider] had recovered in the more than twenty years that had elapsed since Gelb and Goldstein's studies. Indeed, the 40-year follow-up of Adler's patient HC (Sparr et al., 1991) also found the patient's real-life object and face recognition to have recovered considerably. However, she was still severely impaired in her perception of form per se, and sometimes used a tracing strategy when required to solve problems involving shape" (Farah, 2004, p. 22).

Consistently with this kind of compatibilist framework, we believe there is a direct mapping between a kind of “dual belief system” in Husserl (Yoshimi, 2008) and the two levels of motor intentionality and explicit reasoning we’ve emphasized in Merleau-Ponty.[7] One level of belief in Husserl corresponds to “passive synthesis”, which is associated with embodied interactions in the world and motor intentionality. The other level of belief corresponds to “active synthesis” and is associated with explicit representations. The differences between Husserl and Merleau-Ponty are mainly matters of emphasis. Merleau-Ponty is focused on embodied interaction in the world and motor behavior, while Husserl is more focused on epistemological questions about how we come to know the world and the things in it, building up or “constituting” a sense of the place we live, the people around us, the beliefs and practices of our culture, and also more abstract knowledge like that of science and mathematics (Yoshimi, 2016, pp. 5-10).

Passive and active synthesis in Husserl are two ways of “synthesizing information” into our overall picture or model of the world. Passive synthesis is the kind of accrual of information that occurs when we are not fully attentive to a perceived object (“passive” can simply be understood as non-attentive). This occurs relatively automatically and mostly corresponds to bodily and motor activities. For example, when climbing stairs, one does not think about exactly how much the feet should be lifted or the frequency of successive steps. As Husserl says, “The environment is copresent as a domain of what is pregiven, of a passive pre-givenness, i.e., of what is always already there without any attention of a grasping regard, without any awakening of interest” (Husserl, 1973, p. 30). Most of the time things unfold as we expect, but sometimes things are slightly out of place or unexpected. Depending on the case we reinforce or update or modify our implicit model of the world. This kind of automatic refining and updating is formalized using a Bayesian learning rule in (Yoshimi, 2016), which is compatible with how the kind of skills and habitual practices associated with motor intentionality are generally understood (Körding and Wolpert, 2006; Wolpert *et al*., 2011; Parr *et al*., 2022).

[7] That article defends a conception of Husserlian phenomenology which “is compatible with Heideggerean phenomenology and associated approaches to cognitive science (in particular, dynamical systems theory). Taken together, then, that paper and this one begin to develop a common project across all three canonical phenomenologists (Husserl, Heidegger, and Merleau-Ponty). This does not imply full compatibility, but rather a large domain of overlapping content which can be developed in the context of naturalized phenomenology.

Active synthesis corresponds to focused and deliberative behaviors (Husserl, 2001, p. 95). In the active mode, we "explicate" contents from the passively pre-given materials of everyday life, and treat them as explicit themes, often moving from one item to another in a deliberative chain. Husserl gives the example of moving from a flower-bed to a flower within it:

> The *ego abandons its original substrate* instead of continuing to hold it in grasp, while it retains in active apprehension what has just been characterized as explicate. If, for example, a flower bed attracts our attention and becomes the object of contemplation, it may happen that one of the flowers apprehended in the explication attracts our interest so strongly that we make it our exclusive theme, while we abandon all interest in the flower bed (Husserl, 1973, p. 130).

Husserl has a great deal to say about these explicit processes, devoting several volumes to the passive/active distinction (or similar variants), and associating active processes with the "phenomenology of reason".[8] Indeed the phenomenology of explicit processes of mathematical and logical reasoning were a major preoccupation of Husserl throughout his career. But Husserl never abandons the idea that these explicit processes only arise from a more basic fundament in passive experience, consistently with Merleau-Ponty's account.

In fact the materials Merleau-Ponty drew on from the Husserl archives were texts emphasizing everyday experiences of objects in the pre-reflective lifeworld and how explicit structures emerge from this basic foundation. Texts Merleau-Ponty consulted include a longhand copy of *Ideas 2*, Landgrebe's copy of *Experience and Judgmen*t (which was yet readily available since the Nazis had destroyed most available copies), and a group of manuscripts concerned with "primordial constitution", which contained "elaborations of the intentional genesis of the most original layers of the consciousness of things" (Van Breda, 1992, pp. 152-153).

One thing our study of Merleau-Ponty has revealed is how complementary passive and active processes like motor intentionality and explicit thought are. While Husserl (like Dreyfus) focuses on cases of breakdown, where something catches our attention and suddenly becomes explicit, in daily life the two are constantly interwoven. We engage with

[8] Phenomenology of reason is the name of Chapter 2 of *Ideas 1*, but the topic is also central to the *Logical Investigations*, the *Lectures on Active Synthesis*, *Experience and Judgement*, and *Formal and Transcendental Logic*. It is also an implicit concern of his early work in *Philosophy of Arithmetic* (the phenomenology of mathematical practice).

things in a completely implicit and habitual way all day long, and we *also* focus our attention in deliberate ways and think about things all day long. The two types of process are in constant interaction. We drive, we walk, we cook, we clean, we type, we browse, and for much of this time we are also day-dreaming, talking to friends or coworkers, deciding what to do, planning things, etc.. These two streams of activity frequently intersperse: a friend suggests another route while driving, a coworker suggests you format a document differently, a stray thought of a doctor's visit compels you to adjust your posture, etc. Some of these fluid interactions were missing in Schneider, because some explicit representations were unavailable. He could not guide himself by these layers of abstract form, and given how often such representations are invoked in daily life, he was no doubt slowed down, despite his effective compensations.

Conclusion

Representational and embodied approaches to cognitive science are often presented in opposition to one another, with Merleau-Ponty serving as a historical precursor to embodied approaches. We have argued that the two positions need not be in opposition, but should rather work together in the explanation of human behavior. To support our arguments, we introduced two forms of representation associated with two distinct processes. Motor intentionality is a process of direct embodied interaction (reflexes, habits, skilled behaviors) which use mediating representation to bind sensory information together and guide behavior. Such representations arguably occur even in simple animals, or Braitenberg vehicles, and can transiently occur in cases of representational drift. The word "representation" is often avoided in discussions of such systems but we've argued it makes perfect sense here: these are internal states that reliably indicate specific stimuli (even if just during a transient episode), that mediate sensori-motor interactions, and that are associated with a determinate phenomenal character, "patterns endowed with a typical or familiar physiognomy". These implicit processes correspond to what Husserl describes as passive synthesis, a foundation of basic belief and model construction that informs how we get to know and understand our surroundings.

Higher-level processes like reasoning are processes that make use of more explicit representations. Husserl calls these active processes, which are associated with focused attention and “explicated” propositional contents. These processes unfold sequentially and are at the center of rational thought. They can occur as extended ruminations, can be triggered by episodes of sudden “breakdown” where something unexpected occurs, but are also, we’ve argued, fully woven into more automatic processes of motor intentionality, as for example when a friend makes explicit suggestions while the two of you cook.

From this standpoint, the Schneider case makes vivid what happens when both types of process (motor intentionality and high level reasoning; passive and active synthesis) are intact, but when some explicit representations are damaged. A certain stratum of virtual or projected space is lost, and so a certain kind of abstractly guided behavior is unavailable to him. Schneider cannot respond to requests to point at his nose, or to perform a salute, or to draw a circle in the air, though he can with some effort achieve what is requested by other means.

Our approach is pluralist and compatibilist in multiple ways. We have drawn on both embodied and representationalist cognitive science, on empiricist and intellectualist traditions, and on Husserlian and Merleau-Pontyan approaches to naturalized phenomenology (with Heideggerean approaches in the background as well; see note 7). The mind, the brain, and their linkage via neuro-phenomenolgy are complicated matters, and we should make use of all the tools available to us in our effort to understand them, drawing on multiple approaches to cognitive science and phenomenology, even when they are nominally opposed to one another.

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