\*\*\*This is the introduction for my monograph, *Thinking and Perceiving: On the malleability of the mind*, forthcoming in Routledge’s *New Problems of Philosophy* series.\*\*\*

*Introduction*

To be in the world is to be in contact with it. This is not a distinctively human phenomenon, or even one exclusive to living organisms. Tables and chairs, sticks and stones, soundwaves and bits of matter, are all objects that are in contact with other worldly objects. An intuitive notion of contact can help us to understand similarly intuitive features—which isn’t to say unimportant or unreal features—of the animate and inanimate world and, importantly, about the human mind.

Try to imagine an object in the world that is not in contact with anything else. You may find this hard to do. You can, of course, imagine an object, perhaps any object, all alone in some science fictional void. Philosophers allege to be very good at this kind of thought experiment. But this is not to imagine a lone object *in the world.* So then one might think of abstract objects. For example, some believe that there exist objects beyond those in the physical world, such as numbers. But you don’t step on a number on your way to the café or bump into one as you get a drink of water in the middle of the night. Numbers are not, in an important sense, in the world. One way to make sense of this non-worldly existence of a number is to say that it is not in contact with worldly objects, whether it is you or me, or a stick or a stone. Worldly objects, then, seem to be objects that can be in contact with others. This may just be what it means to say that something is *in the world*. This raises a new question: what are the different ways that objects can be in contact with one another?

From an intuitive folk perspective, objects are in contact when they are “in touch” with one another. My coffee cup sits on my desk. My feet are touching the floor. And so on. And, intuitively, objects that are in contact can often move one another. The coffee cup can be moved across the desk by a third object, say my hand. It is now in contact both with the desk and with my hand. Not all objects can move themselves, but most can be moved by some other object/s. Physics largely vindicates these and other intuitions about contact, identifying types of spatial relations between objects and how various forces can effectively exploit those spatial relations for causal ones. The coffee cup moved by the hand is described by the physicist as a *contact force* where, strictly speaking, the objects do not touch but electrons near their surfaces do. When this happens, the rest/motion state of one object is changed by another. Although it may use terms other than ‘contact’, modern physics further identifies a number of ways that physical entities interact—electrical interactions, magnetic forces, gravitational pulls—which further clarify how those entities are in contact with one another. The physical world of objects is a world of entities in contact. Physics illuminates what folk intuition starts with (that, and more, of course).

That said, the notion of ‘contact’ used here is not, or at least is not restricted to, a technical one like one/s identified by the physicist, but is instead an intuitive notion useful for identifying differences and similarities between the ways that we situate ourselves, as creatures with very sophisticated minds, within the world. It includes causal relations but is not exclusive to them. The pebble on the ground is in contact with the ground, but perhaps neither is causally affecting the other. Maybe we want to describe this as a potential causal relation: for instance, if the ground shakes, the pebble will be moved. Contact can also occur at great distance. The ultraviolet light from the sun doesn’t move the (macroscopic) object, but waves of light do get absorbed by most objects and, consequently, they heat. We naturally say of such a situation that the sun is “hitting” or “touching” it. This too is an intuitive form of contact between entities.

Now consider objects with minds: a bird, a dog, a dolphin or, us. As physical objects, such creatures can obviously be in straightforward physical contact with others. They can also be moved, causally, by other objects, and can themselves animate other objects. But they can importantly do more than this and, like the sun, from considerable distance. The bird that hears a song from its mate across the field is in touch with its mate. The dog that sees the frisbee as it flies through the air is in contact with the frisbee. The dolphin maintains contact with its peers by transmitting and receiving meaningful noises underwater. These are familiar ways that an animal can be in contact, through its senses, with the world.

Contact with the world is not distinctive of humans. But what may be distinctively human is the richness and variety of the contact we can make with the world, with our bodies and minds. Most obviously, humans use their bodies to carry out actions: to walk across the grove, reach for and grasp an apple, take a bite of the apple. Perhaps less actively, one is also in contact with the world through one’s sensory perceptual capacities, just like other animals. With some sensory modalities, this contact may seem less direct than bodily action. But here too there is *exchange of energy*. With audition, for example, sound waves in the immediate environment cause vibrations in the eardrum; this pressure is amplified to affect fluids in the inner ear—the cochlea; activity in these fluids cause vibrations in tiny fibers in the cochlea; and finally, certain frequencies of those vibrations activate tiny hair cells which, through the cochlear nerve, send electrical energy to the cerebral cortex. So although through a long causal chain, there is a clear sense in which the auditory experience that one enjoys is a way of being in contact with the world outside of oneself. This *sensory transduction* likewise occurs for experiences in other sensory modalities. Perhaps the least directly, humans can be in contact with the world by using various modes of cognition: we form beliefs about the objects in our environment, memories of how it was in the past, and expectations of how it will be in the future. The reader might pause here to consider the importance of how we make contact with our world, and with one another. Imagine how dramatically different, perhaps *in*human, our existence would be if we did not enjoy the richness of contact that our minds afford. One way to understand this book is as an attempt to make sense of perceptual contact and cognitive contact, and their relations. And this is no mere academic or scientific exercise.

What perceptual contact gives one, when one’s sensory systems are working properly, is information about one’s environment. The visual experience of the apple on the tree carries information, for the perceiver, about important features of one’s world. So, in addition to, and plausibly because of, the exchange of energy between world and perceiver, there is an *exchange of information* between world and perceiver. This is what cognitive contact provides as well, even if it is contact that does not (always) involve exchange of energy. When I am recalling my experience of the apple grove yesterday, I maintain contact with that part of the world by carrying information about it. This is true of any kind of accurate thought that one has about the world: those thoughts stand in informational relations with the objects, features, and events that they are about. Put in another idiom, perceptual and cognitive contact are (re)presentational connections with the world.

This suggests a way of marking a distinction that some find intuitive, and that philosophy and psychology have tended to mark in theory, the distinction between perception and cognition, between, say, seeing an apple versus thinking about an apple. The first seems to require exchange of energy, while the second does not. Except in rare cases of hallucination, any particular perceptual experience is one that requires some exchange of energy between world and perceiver. Some feature of the world has to cause some kind of response in one’s sensory organs. This is not true for any particular cognitive state that one might have. One *can* have beliefs, memories, expectations, and so on about things with which one is not presently in that kind of contact (that is, where no relevant exchange of energy is occurring). But note, at the same time, how both involve maintaining contact through information: my visual experience and my memory of the apple both carry information about that worldly object. Which matters more: the difference with respect to energy or the similarity with respect to information? And how will either contribute to vindicating (or undermining) the distinction between thinking and perceiving?

If we consider contact in the basic sense of two objects causally relating, and in the sense of sensory contact, we see that there is not a clean or easy distinction to be made between the first and the second, at least not with respect to the exchange of energy. But in philosophy and cognitive science, it is assumed by many that there is some clean distinction between the kind of informational contact with the world that, say, vision affords and the kind of informational contact that, say, belief affords. Again, cognition is supposed to be distinct from sensory perception, and moreover the two are supposed to function in importantly independent ways. This is often described with computational language. The computations performed by vision, once it has received information (via energy) from the external worldly stimulus, run independently of any computations being run by cognitive systems. The central question to be discussed over the chapters that follow is whether and how this is true. Are cognition and perception so isolated? Or, given that they are both rich and important means by which humans achieve and maintain informational contact with the world, are they connected and intertwined in ways that depart from the theoretical orthodoxy? Put most simply, how much, and in what ways, does thought influence perception?

In Chapter 1, thought and perception will be distinguished with more precision, with a number of possible criteria for distinction discussed. For now, just grant the intuitive distinction between cognitive states like belief or judgment on the one hand, versus sensory perceptual experiences like seeing or hearing on the other. The question is how the first, cognition, might influence the second, perception. Consider some example cases. Some of these are phenomena about which no party would disagree. That is, they actually happen and we can be confident about this from both an intuitive and scientific perspective. Others are more controversial. It’s the controversial cases that will populate this book, but we do well to identify a range of cases, moving from the least to the most controversial so that, ultimately, we can identify structural similarities and differences between them and, with any luck, better understand how the mind works, and how it puts us in contact with the world.

1. The first time you saw the Muller-Lyer illusion you, like most subjects, perceived one line as longer than the other. But then someone informed you that this was an illusion and that, in fact, the lines were of the same length. You believed your informant (perhaps they provided you with demonstrative proof), and as a result you come to believe that the lines are of the same length. But, because it is a *persistent visual illusion*, the change in belief does not change your visual perception: you still visually perceive the lines such that one appears longer than the other.

Here cognition is affecting cognition, but without affecting visual experience.

2. You’ve hired a fancy interior designer. He has brought you an item for your living room: it’s a bright pink, faux animal rug. “Faux animal hair is back. And this is ‘millennial pink’. It’s fab.”, he says. You take one look at the thing and you feel queasy. “Get that thing out of my sight!” you implore. Your hired design hand complies, rolling the rug and removing it from view.

Here a cognitive state, say a judgment or evaluation, causes you to issue a command, and as a result the available visual stimuli change and, consequently, you have a distinct visual experience: no more millennial pink experience for you!

3. You’re at a modern art gallery. You’ve found yourself in a room full of Pollocks. You don’t like Pollock. You know the drill: you are told that it’s an “action painting” and that the marks on the canvas are a record of Pollock’s movement. But it still looks like a chaotic mess to you. You decide to skip this room and walk to the next. Ahhh….Rothko. Peaceful. Orderly. Simple. You have a seat and take in the calm room.

Here a cognitive state (or a decision partly constituted by such states), causes an action, and as a result of that action you have distinct perceptual experiences.

4. I’m writing this chapter using word processing software on my desktop computer. I try to stay focused on the current task, but it’s also World Cup season. I have the current match streaming on a small window in the upper left portion of my screen. I abandon writing for a few minutes and shift my focus to the match.

Here what I believe (and desire) about available visual information causes me to shift my attention from one portion of my visual field to another and, consequently, to have a different visual experience.

5. You go to pick your friend up at the airport on an extremely busy travel day. You meet her in the baggage claim terminal. There is a sea of baggage, most of it darkly coloured, black or navy, and so you begin aimlessly, visually scanning. “My bag is orange”, your friend says to you. Upon receipt of this information, the few brightly coloured pieces of luggage pop out, becoming salient, in your experience.

Here what you believe—that the item of interest is orange—causes attention to select items with that feature. This aids visual search and, on one interpretation\*, plausibly is a different visual experience than the one you had prior to learning the colour of your friend’s luggage, and as a result of your forming a belief about the orange luggage.

6. You hold an item in each hand. In the right hand is an American quarter; in the left hand is a metal disc of the exact same size and shape. You hold both before me in plain sight and ask which is bigger. I report that the quarter appears bigger. We repeat this procedure multiple times, with coins of different values, and I consistently report that the coin is larger than what (in actual fact) is an identically sized metal disc.

Here what I believe—that one object is a bit of valuable currency and another is not—is influencing the reports that I make about the size of objects. On one interpretation\*, this belief (or beliefs) is affecting the visual appearance of things, and that is why I report as I do. It is affecting low level-vision, namely, the representation of the size of objects, such that I see the coin as larger than the analogous metal disc.

7. Consider the expert ornithologist. Before taking up birdwatching, to this individual, birds looked like, well, birds: objects with roughly the same shape, texture and size (at least relative to other objects). But after the ornithologist has achieved a high-level of expertise, she is able to categorize birds with a high level of specificity—this one is an Eastern Kingbird, that one an Eastern Phoebe—and to distinguish individuals one from another. She can do this rapidly, and on the basis of her visual experience of birds.

Here, what the expert has learned about categories of bird clearly influences what and how she is able to make judgments about birds. On one interpretation\*, this learning is or has also influenced how she sees birds. For the expert, but not for the novice, visual information picks up, represents, high-level categorical information about birds. The expert doesn’t just judge that a particular bird is an Eastern Kingbird, she visually perceives this.

Cases 1-4 are not controversial. Each of these phenomena are actual, and they possess the mental features attributed to them, as described. And there are countless other cases that take the structure of such cases. Cases like 5-7 do occur under *some* description. But there is substantial controversy regarding how such cases should be explained in terms of their mental features. A relevant controversial interpretation has been offered for each of these cases, marked with an ‘\*’.

The theoretical aim of this book is to defend cases like 5-7 as occurring, and as being best explained in something like the ways given by the controversial interpretations (those marked with an ‘\*’). Contrary to orthodoxy in philosophy and cognitive science, the claim is that thinking influences perceiving not just by causing intermediate action or overt attentional shifts, but in more nuanced and direct ways. These influences on perception are deeply important for philosophical and scientific theorizing both, as we will see. They are also important for how we conceive of ourselves as being in the world. To make this case, though, a broad survey of some of the existing, relevant conceptual and experimental work in perception studies is needed.

*Chapter preview*

The goal of Chapter 1 is to provide the reader with some intuitive, and then more sophisticated, understanding of how philosophers distinguish thought or cognition on the one hand, from perception or sensory experience on the other; identify important similarities and differences between the two broad categories of mental process; and, finally identify possible interactions between these processes and their importance.

Chapter 2 critically analyzes the modularity theory of perceptual systems. This theory denies that one’s thoughts can influence one’s visual experiences in any interesting or direct way. Vision, like other perceptual systems, is argued to be functionally independent of cognitive states like belief. The chapter identifies the central commitments of that theory, and its clearest and most formidable arguments. It criticizes those arguments and concludes that they are insufficient to support the theory, and the orthodox place it holds in contemporary philosophy of perception and cognitive science. Chapter 3 couples with chapter 2, offering a brief survey of types of empirical cases that have been employed to oppose modularity.

Chapters 4 and 5 attempt to shift the discussion of possible cognitive effects on perception. Chapter 4 focuses on definitions of the “cognitive penetration” of perception, suggesting that the variety of extant definitions, given their differences, may ultimately miss what is most important to all theorists involved in the debate(s). The suggestion, indeed the methodological prescription, is to look not for phenomena that satisfy this or that definition, but instead for cognitive-perceptual relations that bear some of the consequences of interest to all parties in the relevant debates. Chapter 5 focuses on what kinds of mental process or mechanism are relevant when asking if thinking affects perceiving. The mechanism of central interest is covert, selective attention. The chapter argues that when attention takes this form (by contrast to overt, spatial attention), and plays a role in cognitive effects on perception, we plausibly have instances of important and/or direct cognitive influence on perception.

Chapters 6 through 8 attempt a more dramatic shift to the discussion on cognitive effects on perception. The phenomenon of central emphasis is perceptual expertise. The attempted shift is multi-faceted. First, it encourages an emphasis on possible and, it will be argued, actual cases of perceptual improvement. This contrasts with the standard and dominant emphasis (in this particular literature, and in philosophy of perception more generally) on negative or neutral cases, cases where we at worst suffer illusion or hallucination and at best just perceive “normally”. This involves both an architectural component and an epistemological one. By appeal to a large set of empirical studies, and a wide range of experimental method, Chapter 6 argues that perceptual experience can change in important ways as a consequence of concept-rich, cognitive learning. Chapter 7 then argues that such cases are not only epistemically good, but they are epistemically virtuous, involving acquisition of cognitively enhanced perceptual skills, and ones for which the expert is to be credited. Chapter 8 then teases out some of the most interesting consequences from those architectural and epistemological analyses, concerning scientific investigation and theory-ladenness, implicit bias and stereotype, and objectivity and perceptual content.

The second attempted shift, important enough to foreshadow here, is a dialectical one. Since relevant concepts have not yet been provided for the reader, the foreshadowing will be light. In the literature on cognitive effects on perception (sometimes called the “cognitive penetration” literature), there is a standard assumption made by theorists on both sides of the debate. That assumption is that there is a default theory of perception, at least with respect to how thought may affect perception. That theory is modularity. Any theorist who wants to claim that cognition importantly influences perception thus tends to defend cases as providing counterexamples to the default theory. Advocates of the default theory then argue that those counterexamples fail. (The reader will find examples of this in early chapters of the book.) For this theoretical situation to be well grounded, for a theory to be the *default*, it must enjoy powerful arguments, or powerful explanatory and predictive purchase, ideally both. The critical mode of this book is that the putative default theory enjoys neither. The positive mode of this book—and the chapters on perceptual expertise are central here—is to pivot to cases of cognitive improvement of perception, and a mental architecture that characterizes perception as malleable. And the cases are positive both in the sense that they are epistemically virtuous, and in the sense that they are explained and argued on their own merits. The second shift, thus, is away from a proof-by-disproof strategy to a proof-by-proof strategy. Put another way, the theoretical approach advocated here, even if incomplete, is an *alternative* approach, and its value is not beholden to providing or being a counterexample to the default.

How and whether thinking affects perceiving is a deeply important question. Of course it is of scientific interest: to understand the human mind is to understand how we best distinguish its processes, how those processes interact, and what this implies for how and what we may know about the world. And so in the philosopher’s terms, this book is one on both mental architecture and the epistemology of perception. But there is a more human interest, and one that will increasingly surface over the course of the chapters that follow. How we make contact with the world, and with one another, is of the most basic of importance. We can make both sensory contact and cognitive contact with the world. The first is traditionally supposed to be determined by the biological nature of our sensory systems, while the second is at least partly determined by us, what we have learned, our experiences, and so on. The most basic claim of the book is that this is mistaken and importantly so. Our sensory contact with the world can also change and in a way that is importantly affected by the cognitive contact that we have, or have had, with the world. Thinking does not just affect perceiving, thinking improves perceiving. If this is true, it changes not only how we should theorize the mind, it changes how we should understand, as individuals, our place in and contact with the world.