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A Multisensory Philosophy of Perception

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Abstract

This book argues that human perception and perceptual consciousness are richly multisensory. Its thesis is that the coordinated use of multiple senses enhances and extends human perceptual capacities and experience in three critical ways. First, crossmodal perceptual illusions reveal hidden multisensory interactions that typically make the senses more coherent and reliable sources of evidence about the environment. Second, the joint use of multiple senses discloses more of the world, including novel features and qualities, making possible novel forms of perceptual consciousness. Third, through crossmodal dependence, plasticity, and perceptual learning, each sense is reshaped by the influence of others, at a time and over time. The implication is that no sense—not even vision itself—can be understood entirely in isolation from the others. This undermines the prevailing approach to perception, which proceeds sense by sense, and sets the stage for a revisionist multisensory approach that illuminates the nature, scope, and character of sense perception.

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Preface

Sense perception is the most vivid form of lived human consciousness. You may see the flash of a cardinal taking flight, hear the thumping of a hammer, or detect a faint citrusy smell. Through our senses, we encounter the world. We believe what we see, and our senses guide what we do. The senses are central to distinctively human aesthetic experience. Reflecting on perceptual impairments reveals how much each of our senses matters.

Understanding the interface between the mind and the world has animated a philosophical tradition stemming from Plato's *Theaetetus* and Aristotle's *De Anima*. From the early modern era to the present, philosophical thinking about perception and its significance has been shaped to a remarkable extent by attention to vision. However, vision does not stand alone. At most waking moments, people perceive using their other senses. We hear, smell, taste, and touch our surroundings. Nothing guarantees that what we say about vision extends neatly to the other senses.

Recently, philosophers have challenged claims about perception and perceptual consciousness founded on vision alone. For instance, I have argued that the temporal nature of sounds and the ways sounds occupy pitch space confound 'visuocentric' thinking about the objects of perception. Attention exclusively to vision blinds us to the scope and nature of what we perceive. This has implications not just for philosophy but also for art and aesthetics, sound studies, and music theory.

Other philosophers have looked beyond vision to touch, bodily perception, olfaction, and taste for insights about how our senses acquaint us with the world. This has reoriented the philosophy of perception, enriching how we understand spatial awareness, what it is for an experience to represent, and whether brain processes could fully explain sensory consciousness. What goes for vision does not always go for our other senses.

Still, no sense is an island. Each sense operates against the background of others, and people typically perceive using multiple senses. Indeed, the most striking discovery in the cognitive sciences of perception during the past two decades is that sensory systems interact extensively with each other.

Sensory interactions sometimes lead to surprising perceptual illusions. Some people hear sounds as colored, feel touch from sounds, or taste shapes. Synesthesia has inspired artists from Kandinsky and Hockney to Pharrell Williams (*Seeing Sounds*). Some say it helps ex-

plain metaphor, creativity, and the origins of language itself. However, synesthesia is rare, affecting just five percent of the population.

Perceptual science has shown that sensory interactions are far more widespread. Seeing a talking face can change how speech sounds—for instance, you may seem to hear /da/ rather than /ba/ just because you see someone articulate /ga/. In the sound-induced flash effect, hearing two clicks makes one flash look like two. In ventriloquism, you hear the sound's location differently because you see the dummy. Crossmodal illusions are pervasive. They occur in typical perceiving subjects across a wide range of domains with numerous sensory pairings. Just as visual illusions illuminate how vision functions, crossmodal illusions reveal how the senses work together.

Crossmodal illusions are surprising. One sense can reshape what you perceive with another. This conflicts with common sense, which presupposes that our senses are separate. What remains unclear—what the science does not settle—is how sensory interactions are reflected in the conscious lives of perceiving subjects, and why they matter. Answering these questions requires confronting philosophical questions about perception and perceptual consciousness.

This book addresses these questions. It explores the multisensory nature of perception and its theoretical and philosophical significance. Against philosophical orthodoxy, which treats perceptual consciousness as a collection of experiences associated with vision, hearing, touch, taste, and smell, this book contends that human perceptual consciousness is constitutively and irreducibly multisensory. It develops an account of multisensory perception in which coordination and cooperation among the senses improves and augments human perceptual capacities. The normal and optimal functioning of each sense requires the support of multiple senses.

According to this account, the coordinated use of multiple senses enhances and extends human perceptual capacities in three critical ways. First, crossmodal perceptual illusions reveal hidden sensory interactions that perform multisensory functions. But such interactions are far more widespread. Typically, they make each sense more reliable and thus a better source of evidence about the environment. The cost is predictable illusions. Multisensory interactions serve an important purpose by improving perception's coherence, accuracy, and reliability. Spatial hearing improves when it listens to vision, and lipreading supports speech comprehension as much as a good hearing aid. Such perceptual improvements can reverberate as epistemic advantages. Believing your senses works better when your senses work together. More reliable perception means more reliable cognition. Multisensory epistemology thus reaches beyond what meets the eyes and the ears. What's puzzling is that crossmodal recalibrations and illusions typically go unnoticed—you may not realize that what you see affects what you hear.

Second, the joint use of multiple senses discloses more of the world, giving us conscious access in perception to novel features and qualities. New aspects of the world are perceptible

only thanks to the coordinated use of multiple senses. Umpires in baseball are trained to tell whether a baserunner is safe or out by watching the foot touch the bag while listening for the sound of the ball striking the glove. Umpires are sensitive to perceptible intermodal temporal order. At the movies, images on screen appear to make the sounds you hear—a misaligned soundtrack is grating. Something visible can perceptibly bear audible features. Or, thanks to the way smell, taste, and somatosensation work together, novel qualities, such as flavors—the *mintiness* of mint, the *spiciness* of capsaicin—are experienced only multisensorily.

Multisensory perception therefore does more than improve the testimony of the senses. Sometimes one's multisensory capabilities are evident. The joint use of our senses enables new forms of perceptual awareness. As a consequence, perceptual consciousness is not always specific to one sense or another. Contrary to the received view, this book argues that the phenomenal character of sensory consciousness itself is irreducibly multisensory. This contravenes a central assumption in the empiricist philosophical tradition, according to which each experience has a distinctive sense-specific character. Sometimes, perceptual consciousness itself is ineliminably multisensory.

Third, each sense depends on the influence of others. Multisensory perception even reshapes unisensory perception. Perceptual capacities associated with one sense depend on other senses. Perceptual learning can enable us auditorily to detect features that otherwise are accessible only through sight. Crossmodal parasitism can infuse an auditory experience with characteristics inherited from vision. So, one sense can change over time thanks to another. This means the auditory experience of a congenitally blind person may differ from someone who sees. A surprising conclusion follows. While a deficit in one sense can enhance another sense, deficits in one sense also can ramify as deficits elsewhere. Famously, spatial hearing improves with blindness, but by my account blindness also yields hearing deficits. Appreciating crossmodal plasticity makes room for a novel account of sensory enhancement using prosthetics, such as cochlear implants, and substitution devices.

Sensory plasticity and crossmodal dependence present a dilemma for the sense-by-sense approach. Either it ignores what other senses contribute to sight and hearing, or it excises each sense from the others, thereby throttling back its capabilities and altering its character.

The implication is that no one sense—not even vision itself—can be understood entirely in isolation from the others. This overturns a prevailing unisensory approach to sense perception and perceptual consciousness, which assumes that each sense can be theorized in isolation or in abstraction from the others. Perceiving is not just seeing, hearing, touching, tasting, and smelling at the same time. No complete account of perceptual consciousness or its role can be formulated without confronting the multisensory nature and character of perception. This sets the stage for a revisionary, multisensory philosophy of perception.

Abstracts and keywords

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This book argues that human perception and perceptual consciousness are richly multisensory. Its thesis is that the coordinated use of multiple senses enhances and extends human perceptual capacities and consciousness in three critical ways. First, crossmodal perceptual illusions reveal hidden multisensory interactions that typically make the senses more coherent and reliable sources of evidence about the environment. Second, the joint use of multiple senses discloses more of the world, including novel features and qualities, making possible new forms of perceptual experience. Third, through crossmodal dependence, plasticity, and perceptual learning, each sense is reshaped by the influence of others, at a time and over time. The implication is that no sense—not even vision itself—can be understood entirely in isolation from the others. This undermines the prevailing approach to perception, which proceeds sense by sense, and sets the stage for a revisionist multisensory approach that illuminates the nature, character, and scope of sense perception.

Keywords: multisensory perception, consciousness, perception–cognition distinction, the senses, crossmodal illusion, plasticity, synesthesia, perceptual learning, psychophysics, phenomenology

Chapter 1: Introduction

This chapter presents the book's thesis, its central themes, and its plan of attack. First, it describes the unisensory paradigms for investigating perception that until recently prevailed in science and in philosophy. Next, it introduces the critical respects in which perception is multisensory and explains why this is a problem for unisensory theorizing. Finally, it introduces the central questions any multisensory philosophy of perception must face, and it outlines the answers and arguments in the chapters that follow. The thesis to be defended is that coordination among the senses enhances the coherence and the reliability of human sense perception, extends its reach, and makes possible novel varieties of perceptual consciousness.

Keywords: perception science, philosophy of perception, unisensory, multisensory, crossmodal illusion, sensory integration, senses

Chapter 2: Processes

Crossmodal perceptual illusions such as ventriloquism, the McGurk effect, the rubber hand, and the sound-induced flash demonstrate that one sense can causally impact perceptual processing and experience that is associated with another sense. This chapter argues that such causal interactions between senses are not merely accidental. Interactions between senses are part of typical perceptual functioning. Unlike synesthesia, they reveal principled perceptual strategies for dealing with noisy, fallible sensory stimulation from multiple sources. Coordination between senses improves the coherence and the reliability of human perceptual capacities. Therefore, some perceptual processes of the sort relevant to empirical psychology are multisensory.

Keywords: crossmodal illusion, ventriloquism, McGurk effect, sound-induced flash, rubber hand, synesthesia, functions

Chapter 3: Capacities

This chapter argues that typical human subjects possess distinctive multisensory perceptual capacities. Empirical evidence and theoretical considerations support the claim that perceivers are differentially sensitive to novel intermodal features, such as identity, simultaneity, motion, causality, and flavor, that could not be perceived using one sense at a time nor using several senses working merely in parallel. In light of their role in grounding cognition and guiding action, such capacities belong to perception, rather than extraperceptual cognition, for the purposes of empirical and rational psychological explanation. Therefore, multisensory perceptual capacities can serve in psychological explanations that deal with subjects and their capacities, in contrast with just subpersonal processes and mechanisms. Multisensory perception targets new features in the world. The joint use of multiple senses thus extends human perceptual capacities.

Keywords: capacities, differential sensitivity, causality, simultaneity, motion, rhythm, meter, flavor, intermodal binding, perceptual justification

Chapter 4: Awareness

Perceptual capacities need not be reflected as such in perceptual consciousness. Thus, a subject could possess multisensory perceptual capacities while perceptual consciousness remains sense specific. For instance, a subject could detect and differentiate novel intermodal features without corresponding, irreducibly multisensory perceptual awareness. In response, this chapter argues that perceptual awareness of an object or feature sometimes is constitutively, irreducibly multisensory. In particular, it argues that the exercise of multisensory perceptual capacities can serve to make features that are not otherwise perceptible available to conscious subjects for use in thought, reasoning, and rational action. Multisensory perception thereby fixes which features are occurrently accessible to conscious per-

ceiving subjects. The implication is that multisensory perceptual awareness cannot fully be captured in terms of sense-specific awareness.

Keywords: consciousness, awareness, access consciousness, perceptual belief, action, appearance, seeming, dissociation, attention

Chapter 5: Experience

This chapter argues that perceptual experience is richly multisensory. In particular, phenomenal consciousness is constitutively and irreducibly multisensory. The reason is that the phenomenal character of a conscious multisensory episode can include more than what is associated with each of the respective senses plus whatever accrues due to simple co-consciousness. Exercising multisensory capacities thus makes a phenomenal difference to perceptual consciousness. This difference can obtain whether or not it would enable a subject to discriminate between two otherwise equivalent experiences. It follows that the character of a perceptual episode is not exhausted by what belongs to each of the senses. Therefore, not all perceptual experience is modality specific. Coordination among the senses thus makes possible new forms of perceptual consciousness. Multisensory perception extends the varieties of experience.

Keywords: consciousness, phenomenal consciousness, experience, unisensory experience, phenomenal character, perceptual content, discriminability

Chapter 6: Senses

Multisensory phenomena have been used to challenge the distinctness of our senses. Perceptual processes interact extensively and perform joint functions, while perceptual experience is constitutively and irreducibly multisensory. This chapter presents an account of the senses and what differentiates them. According to this proposal, each sense is a family of perceptual capacities unified and distinguished by the way in which those capacities are exercised. The relevant manner is an information-gathering activity type individuated by the information it functions to extract and the medium from which it does so. Perceiving involves exercising perceptual capacities in one or more sensory manners. Thus, perceptual episodes and experiences may be typed accordingly, without appealing to their phenomenology. The key to this approach is distinguishing the task of individuating senses from that of ascribing modalities to expereriences. This account rejects the independence of the senses while preserving their distinctness. It illuminates richly multisensory perception and captures why it matters.

Keywords: the senses, sensory modality, individuation of the senses, information-gathering, phenomenology, proper sensible, the problem of multiple proper sensibles, active perception

Chapter 7: Conclusion

This chapter recounts the arguments and conclusions reached in preceding chapters. It provides a synopsis of considerations favoring a multisensory account of perceptual processes, capacities, awareness, and experience. It retraces the book's approach to differentiating senses and to distinguishing perception from extraperceptual cognition. It describes the consequences, negative and positive, and it explains their significance. The chapter concludes with the implications and future directions for a multisensory philosophy of perception.

Keywords: process, function, capacity, consciousness, awareness, experience, sense modality, perception–cognition distinction