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The Facts of Perception

Harvey Richard Schiffman
Sensation and Perception: An Integrated Approach (3rd ed.)
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Review by
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For instructors who prefer a text that emphasizes the facts of perception, Shiffman's *Sensation and Perception* should prove satisfactory. The basic phenomena of perception are covered, and a series of demonstrations are provided.

Classic topics in visual perception such as color vision, contrast perception, spatial frequencies, and adaptation, for example, are described in clear and straightforward prose. Basic auditory system facts are also made accessible.

This text does a better job than do many competing books on the secondary sensory modalities such as touch, taste, and smell. There are lengthy sections on vestibular mechanisms, olfaction, and pain, for instance. There is relatively little coverage of the neuroanatomy of sensory processing, but the descriptions of the sensory receptors and organs are clear and accessible. Overall, the text has a style that suggests respect for the student reader's maturity; there is not the frilly, silly feel that is increasingly popular in recent textbooks.

Where the book fails is in providing an "integrated" approach, despite the subtitle and claims made in the introduction. Connections between theories and data are generally not made in a central or compelling manner. Although it is true that perceptual psychology is a science with fair claim to having uncovered a body of "facts," much exciting controversy remains, none of which is well captured in the text. Furthermore, the text neither integrates material across explanatory levels nor provides much theoretical depth.

My own taste in considering the topic of perception differs radically from the perspective represented in this text. I find excitement in teaching the intellectual puzzles that perception poses, most especially those puzzles that surface at the interface between perceptual phenomena and explanations for those phenomena at multiple levels of theory. For instance, the approach to perception made famous by David Marr (1982), in which questions of computation, function, and implementation are considered simultaneously and ultimately in an interconnected fashion, captures my imagination and enthusiasm as an instructor. Marr is not even referenced in the text nor is much work from the ever-growing field of vision. Similarly, exciting developments in connectionist and neural-network models of perception are not covered (e.g., Feldman, 1985).

I was also disappointed in the relative paucity of information about the relation between perceptual phenomena and neuroanatomy. In comparison, the text *Sensation and Perception* by Coren, Porac, and Ward (1984) brings to life the relevance of brain organization on perceptual experience. This area of research is moving ahead at a furious rate these days, and it seems a pity to provide so little coverage of it in a modern text.

The text is equally lacking in integration with higher level functions. For instance, fascinating and central phenomena such as contextual effects in pattern recognition are only briefly described—not explained or integrated with other issues. Yet, context effects, for instance, are central to connectionist theories of perception (see Rumelhart & McClelland, 1986). Topics such as mental imagery, attention, and sensory memory are relegated to the text's final chapter and are hardly integrated conceptually. For example, an enormous literature relates phenomena from mental imagery to visual perception. Shepard (1984), for instance, relates various principles of mental rotation to laws of apparent motion and perceptual experiences with real moving objects. Furthermore, Shepard makes the connection between internal representations and the "ecological" approach to perception (Gibson, 1979)—an approach that Schiffman emphasizes in his introduction and in chapters on motion perception. There has been much recent discovery about the relation between mental imagery and the mechanisms and neuroanatomy of perception (e.g., Farah, 1988) that is not adequately covered in the text.

The text seems to be based implicitly on a definition of *perception* that many would argue is out-of-date. The older view of perception, and the one represented in this text, distinguishes perception from topics such as memory, attention, mental representation, and so on. Yet, some of the most exciting new insights about perceptual phenomena are coming from investigators who approach mental phenomena without using the older classification of topics. For example, Treisman's (e.g., Treisman & Gelade, 1986) feature integration theory has spawned an enormous literature on the relation between object perception and early preattentive and attentive processes operating on simple visual dimensions (e.g., color, motion, orientation, etc.). This literature has developed both downward to connect with neuroanatomical facts about perceptual primitives and upward to connect with cognitive phenomena of attention, consciousness, and object recognition (e.g., Treisman & Gormican, 1988).

Similarly, much recent work has used the framework of mental representation to successfully address problems in perceptual recognition and motor behavior. Many connectionist models of perception are conceptually based on a theory of distributed representation in which, for instance, the very nature of the representation relates directly to phenomena of object recognition. Within experimental psychology, we are seeing a breakdown of the classic division of phenomena into separate areas of perception, memory, attention, or representation. For instance, memory for object position can change in real time within 100 ms after disappearance of the stimulus (Freyd, 1987)—is that a fact about perception or memory? Given that saccadic eye movements are on the order of every 250–300 ms, it seems reasonable to argue that memory distortions occurring within a tenth of a second are relevant to our perceptual experience of the world.

Like the update to the second edition, the update to this edition includes the addition of numerous citations to recent articles. But also like the first update, these additional citations are often just that—citations. There is typically little intellectual meat or scientific depth provided when introducing the new material. Still, for the student interested in recent developments within standard perception areas, the text provides many leads.

The story of perception can be told as a series of facts, or it can be told as an intellectual adventure. Schiffman's *Sensation and Perception* is a solid basic text that tells the former sort of story. Although there are many areas of psychology for which I could not currently endorse a text that took the "facts" route, the field of perception is impressive in the sheer number of facts that can now be told. Indeed, what is now known about perception, and about allied areas, is far too much to cover in a single text. This book is already rather long for the typical undergraduate course. Nonetheless, I would have preferred to see less space devoted to perceptual facts and more attention directed toward seeing perception as an adventure in connecting theory with evidence, in connecting levels of processing, and in connecting mind with reality.

References

Coren, S., Porac, C., & Ward, L. M. (1984). *Sensation and perception* (2nd ed.). San Diego, CA: Academic Press.

Farah, M. J. (1988). Is visual imagery really visual? Overlooked evidence from neurophsychology. *Psychological Review, 95*, 307–317.

Feldman, J. A. (1985). Four frames suffice: A provisional model of vision and space.

Behavioral and Brain Sciences, 8, 265–289.

Freyd, J. J. (1987). Dynamic mental representations. *Psychological Review, 94*, 427–438.

Gibson, J. J. (1979). *The ecological approach to visual perception.* Boston: Houghton Mifflin.

Marr, D. (1982). *Vision: A computational investigation into the human representation and processing of visual information.* San Francisco: Freeman.

Rumelhart, D. E., & McClelland, J. L. (1986). *Parallel distributed processing: Explorations in the microstructure of cognition: Vol. 1. Foundations.* Cambridge, MA: MIT Press.

Shepard, R. N. (1984). Ecological constraints on internal representations: Resonant kinematics of perceiving, imagining, thinking, and dreaming. *Psychological Review, 91*, 417–447.

Treisman, A. M., & Gelade, G. (1986). A feature-integration theory of attention. *Cognitive Psychology, 12*, 97–136.

Treisman, A. M., & Gormican, G. (1988). Feature analysis in early vision: Evidence from search asymmetries. *Psychological Review, 95*, 15–48.