

Perceptual Development in Early Infancy: Problems and Issues

Edited by Beryl E. McKenzie and Ross H. Day. Hillsdale, NJ: Erlbaum, 1987. 302 pp. \$39.95.

The recent fascination in things “down under” has captured most of us. Movies, soda, and other imports from Australia are in great demand. Psychology should be no different. A recent volume made up of solely Australian psychologists reflects positively on the growth of the down-under influence.

Beryl McKenzie and Ross Day have put together “state-of-the-art” essays on perception during the first year or so of infant development. The 12 chapters address several problems grouped into four areas: history and methods, object perception, combining of information from different sensory channels, and speech perception. The final chapter focuses on some emerging themes and speculations about future research.

The goal of the editors in the first chapter is to set the problems and issues in the study of perceptual development in infancy. Although the overview is fairly comprehensive, it reads more like a stream of consciousness of current activities in the field than a systematic stage setting for things to come. For readers to obtain a better framework for the contributed chapters, the editors’ final chapter might be read along with the first.

Do infants expect an integrated sensory experience in which inputs are received from several senses in parallel, or do infants selectively attend to single sensory channels? Consider the perceptual paradoxes presented to infants by Boris Crassini and his colleagues. Mothers’ voices were presented when mothers were out of sight. Similarly, infants watched voiceless faces of their mothers. The lips and other parts of the face moved while the mothers were speaking, but the sound was made inaudible. Impartial observers judged the infants to be grave, surprised, and close to crying. The researchers concluded that the infants’ experience violated their expectations, given the hundreds of previous episodes in which sight and sound of mother were linked together. In contrast to selectively attending to one source of information, infants appear to be able to (and in fact naturally do) integrate multiple sources of information specifying some event.

David Finlay and the late Algis Ivinskis report a host of studies of cardiac change in response to auditory and visual stimuli. The research travels far beyond the topics traditionally addressed in studies of the orienting reflex. The authors have attempted to dissect the orienting reflex, and find several aspects of attention involved in the behavior. Their findings lead them to distinguish among alerting, overt directing, covert directing, detection, decision, and stimulus processing.

Day concludes that size constancy—the veridical perception of size with changes in distance—is established in the first half-year of life. Current experimental procedures with infants cannot measure how complete size constancy is, and there is other evidence that underconstancy occurs until about 10 or 11 years of age. Constancy is also influenced by higher order cognitive processes that can be manipulated by instructions. Day acknowledges the contribution of cognitive processes on visual size constancy, an

unmodular thing to do. Perhaps conceiving size constancy as resulting from the integration of multiple sources of information—both bottom-up and top-down—is a more parsimonious solution.

Michael Cook has documented the ability of 3-month-old infants to discriminate between different solid forms. Infants were habituated to a given form presented at various tilts out of the frontoparallel plane and then tested on a variety of forms presented at a variety of orientations. Previous studies had confounded size discrimination with form discrimination, leaving their interpretation ambiguous. In the present study, infants were tested on both novel forms and novel sizes. The ingenious experiments revealed that the infants can distinguish rectangle from trapezoid, square from triangle, square from trapezoid, and a cube from an L-form.

McKenzie addresses the issue of the development of spatial orientation in human infancy. Expanding on a Piagetian analysis, she assesses the types of environmental features that support allocentric spatial orientation. Her results, along with other research, indicate that infants as young as 8 months have a mental place-keeping system and have difficulty maintaining spatial orientation without using visible cues. In addition, movement is not a necessary condition for a spatial representation of position.

Denis Burnham studies the role of movement in object perception. Although movement is a highly salient stimulus for infants, it functions in several ways. Not unreasonably, it can enhance, suppress, or be incidental to object perception. An intriguing idea is that movement functions as an object feature—whatever this means. The infant learns to attend to those movements that are important for the identification of the objects, and to filter out those types of movement that are unimportant for object identification. The former is biological movement, and the latter is nonbiological movement.

Jeff Field provides a good review of space perception in infants, and concludes that auditory space perception is crude in comparison to visual space perception.

Sharne Rolfe-Zikman reports research on visual and haptic bimodal perception in infancy. One question the author poses is what infants attend to when exploring an object visually and haptically. However, another way of looking at the problem is to uncover how the two sources of information are integrated to achieve perceptual recognition.

One of the best-known and most controversial findings involves neonatal imitation of facial gestures. Ray Over offers a critical review of the results in this area. Imitation necessarily involves a selective matching of the infant's behavior to an adult's (or some other model's) behavior. Imitation must not be confused with the simple elicitation of a fixed action pattern triggered by any social stimulation or generalized arousal. Thus, it is important to demonstrate that the infant is able to discriminate one gesture performed by the model from other gestures performed by the same model. To address this issue, Over describes a signal detection analysis performed on some of the classic results in the area. The outcome of this analysis revealed very

poor discriminability. A review of the literature leads the investigator to conclude that "there is no strong empirical basis for the claim that human neonates imitate facial and manual gestures" (p. 232). Over offers the need to consider the functional significance of imitation as an aid to the context in which it should be studied.

A decade and a half after it had been putatively demonstrated that adults perceived speech categorically, it was shown that infants do the same. Another 15 years has elapsed since the initial findings with infants, and the picture has changed considerably. Burnham, Lynda Earnshaw, and Maria Quinn review the literature on infant speech perception and present some new results. The authors correctly question the belief that auditory speech perception is categorical in the sense originally defined by researchers at Haskins Laboratories. Viewing speech identification as analogous to the identification of hue is a good one and worth stating here. Discriminably different hues are identified equivalently, that is, both a banana and a grapefruit are described as yellow even though their yellows are noticeably different from one another.

Burnham et al. make the case for linguistic experience, but I disagree with their interpretation of what the results mean. Distinguishing between discrimination and identification tasks, the authors argue that both are necessary for a complete description of categorical perception. However, the head-turning task that they adopt for their experiment cannot be unambiguously interpreted as reflecting either or both discrimination or identification. Although they do not appear to make the case explicitly, the authors must believe that their paradigm provides measures of both discrimination and identification. Subjects are trained to respond differentially to two different end-point stimuli and are then tested on intermediate tokens along a voice-onset continuum. The results show that the identification functions become sharper with age. These results lead the authors to conclude that speech perception in infancy is *not* categorical, but becomes increasingly so with linguistic experience. It appears that the authors have forgotten their original analogy to hue identification. Their results say very little about speech perception, beyond the well-known result that speech tokens are identified more consistently with age. Linguistic experience is important, but *how* it is important has yet to be documented.

In their concluding commentary, the editors highlight some of the implications of the preceding chapters. One is that the controversy between direct and indirect perception points of view is far from being resolved. The hopeful note is that we now have more powerful techniques to address the issue. A second observation involves the importance of determining process rather than simply outcome. Finding an increase in the accuracy of spatial perception or speech perception with age is not as important as uncovering the processes responsible for this increase. Related to the orientation towards process is the need for a fine-grain analysis of behavior. As an example, the duration of looking in a habituation study can be supplemented with measures of the nature of the behavior during looking.

In summary, the book is a valuable resource in the area of perceptual development in early infancy, and its provincial makeup of authors might be considered an asset rather than a deficit. Although the editors probably could have made it even more apparent, there is a reasonably consistent set of themes and goals throughout the book. The reader comes away with a more coherent representation of the contribution than is the case with most edited works.

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