Newborns are largely naïve when they enter the world. How can they make sense of the wealth of stable or moving objects, events, and people that they encounter through audition, vision, touch and olfaction? This chapter focuses on the various perceptual mechanisms and crossmodal interactions that exist in newborns. Some crossmodal interactions, such as chemosensory interactions, stem from the prenatal life of the newborn; while others, such as auditory-visual and tactile-visual interactions, only emerge at birth. These interactions present different complexities and levels of processing. Crossmodal interactions observed in human newborns involving the chemical senses, audition, and vision are discussed first. Then, the relations between the visual and the tactile modalities in newborns are examined in detail. These relations shed light on an old philosophical question: Molyneux’s famous question (July, 7, 1688) and the origin of crossmodal identity.

Philosophers and psychologists alike have debated for centuries how humans and other species deal with the multiple sources of sensory information that specify the world around them. Recent years have seen a dramatic increase in our understanding of multisensory processes in mature adults, which have led to the conclusion that multisensory
processes are ubiquitous in mature psychological functioning. However, developmental research has also shown that multisensory integration takes time to develop and that early experience plays a key role in its development. This chapter describes how the development of multisensory functioning can both constrain and enrich perceptual and cognitive functioning through the lifespan. This chapter also reflects on the history of the field, and draws out some key themes of recent research in multisensory development.

Multisensory Development
Andrew J. Bremner, David J. Lewkowicz, and Charles Spence (eds)

Our daily perceptual experiences are, almost without exception, multisensory. We perceive the objects, events and people around us through a range of sensory modalities which convey overlapping and complementary streams of information about our environment and ourselves. A person’s face, the sound of their voice, the way they touch us, and even their distinctive smell, contribute to our perception, recognition and understanding of them. In the last two decades we have witnessed dramatic progress in our understanding of how the mature adult brain integrates the information available to the different senses. However, despite the fact that adults are able to achieve multisensory integration in a seemingly effortless manner, developmental research has shown incontrovertibly that we cannot assume that the same is true for individuals who are at different stages of development, or who have had differing degrees or qualities of multisensory experience. This volume brings together the most recent research programmes from leading developmental scientists who have used a variety of methods to investigate questions concerning multisensory development. The various chapters address the development of a diverse range of cognitive and behavioural functions including classic questions about the multisensory perception of objects, people, language, but also issues which are just beginning to be addressed in detail, such as the development of multisensory interactions in flavour perception spatial navigation, and body representation. Crucially, this volume also tackles questions about how multisensory development comes about. This is achieved through a consideration of developmental processes throughout, and also through coverage of development across a wide range of groups.
“Chunking” the World through Multisensory Perception

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in Perceptual Learning: The Flexibility of the Senses

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This chapter argues that multisensory perceptions are learned, not the result of an automatic feature binding mechanism. For example, suppose you are at a live jazz show. The drummer begins a solo. You see the cymbal jolt and hear the clang. But you are also aware that the jolt and the clang are part of the same event. Psychologists have assumed that multisensory perceptions like this one are the result of an automatic feature binding mechanism. This chapter argues instead that when you experience the jolt and the clang as part of the same event, it is the result of a perceptual learning process. The jolt and the clang are best understood as a single learned perceptual unit, not as automatically bound. This chapter details the perceptual learning process of “unitization,” whereby we come to “chunk” the world into multisensory units, and argues that unitization best explains multisensory perception.