If multisensory objects are detected faster than their unisensory counterparts, is it because of their perceptual/semantic redundancy or because they simply contain more task-relevant features? Our understanding of how perception operates in real-world environments has been advanced by studying multisensory processing and control mechanisms (attentional and otherwise), but in a largely independent manner. Critical insights into the mechanisms underlying multisensory processing have been provided by studies combining brain mapping methods together with distinctive paradigms, varying task demands as well as types of stimulus pairings. Past work revealed that some multisensory processes are determined by the observer’s goals, while others occur independently. However, other dimensions than goal-dependence are necessary to explain the full plethora of multisensory effects at the brain and cognitive level. A novel, “COGs” framework will be presented that construes multisensory processes as lying on continua along three axes: (1) Context-dependence, (2) Object-dependence and (3) Goal-dependence. This new framework is predicated on the observation that some multisensory processes are triggered even by arbitrary pairings, while others are engendered by objects from specific stimulus categories that activate distinct brain networks. Moreover, some processes transpire irrespectively of the paradigm or population, while others are strongly modulated by the specific context, including decisional factors, in which the stimuli appear. The COGs framework is the first to integrate seemingly contradictory findings from experiments employing distinctive experimental setups and stimulus pairings. In this context, it will be demonstrated how one can study specific multisensory processes of interest without the confounding influence of other, unisensory or multisensory processes, and how do recent advances in using electroencephalography help to provide a more accurate picture on multisensory processing and locate them in the broader context of other mental processes.