In *2001: A Space Odyssey*, Arthur C. Clarke foretold the advent of HAL, a computer system who could interpret our actions and, not liking their import, could choose to take steps to eliminate us. Yet in the reality of 2008, we know remarkably little about how any device – whether organic or inorganic – can redescribe dynamic motion in terms of actors’ goals and intentions. What machines currently do is religiously record human action, but they can’t make sense of it. Only humans can do that.

Action presents major challenges to processing: Motion tends to be rapid, complex in its changing relations to other things in the world, and evanescent. As observers, we frequently have access only to fragments of the actual motion stream; we must rapidly register what is relevant and carry out extensive analysis (such as categorization, integration, inference) on-the-fly. This analytic process must be carried out on many levels simultaneously: judgments about action require both sensitivity to fine-grained spatial and temporal details, and the ability to meaningfully integrate lengthy sequences of action separated by long gaps in time.

A common thread across all levels of analysis in action processing may be a joint requirement for detecting and redescribing structure. Recent research indicates that adults are skilled at capitalizing on structure inherent in action, and show a propensity to redescribe such structure to promote inferences. A structure detection/redescription framework for approaching investigation of action processing has the advantage of accounting for how adults process action while also offering a natural approach to illuminating the epigenesis of such skill. My working hypothesis is that structure-detection skills enable infants to become increasingly tuned to relevant information within the motion flow, while redescription skills drive increasingly sophisticated levels of encoding that promote inferences about functional commonalities, intentions and goals. I will report on several lines of research underscoring the promise of this approach.