

ABSTRACT

Continuous experience is naturally parsed into discrete events, a process known as event segmentation. Event Segmentation Theory (EST) proposes that this process depends on working event models, which are active representations of “what is happening now” that support prediction of near-future input. When prediction error accumulates, the current model is updated, and an event boundary is perceived. Building on this framework, the present dissertation addressed a central question: how is the balance between maintaining and updating of the working event model dynamically regulated during event segmentation? To address this question, four studies examined event segmentation from oscillatory, cognitive control, developmental, and neurochemical perspectives.

Across studies, the findings converged on several conclusions. First, maintaining and updating of the working event model were associated with distinct neural oscillations, indicating that event segmentation is implemented through coordinated oscillatory mechanisms. Second, the balance between maintaining and updating was not fixed, but could be shifted by metacontrol mode: persistence-heavy control lowered the threshold for updating and promoted finer-grained segmentation. Third, adolescents were also able to shift this balance under persistence-heavy instruction, although the resulting behavioural and neural modulation remained below adult levels. Fourth, neuromodulatory state also influenced this balance, with atVNS biasing processing toward maintaining and raising the threshold for updating, most likely through GABA-mediated strengthening of inhibitory gating. Beyond these specific findings, two broader conclusions also emerged. First, these modulatory influences appeared to operate on a shared segmentation architecture rather than producing qualitatively different segmentation systems. Second, updating appeared to preserve a degree of representational continuity, with information from the preceding event being transiently carried forward into the newly established working event model.

Taken together, the dissertation supports an integrated account in which event segmentation is governed by the dynamic regulation of the balance between maintaining and updating of the working event model. This work advances a regulatory perspective on event segmentation and contributes to a more unified understanding of how continuous experience is structured into meaningful events.