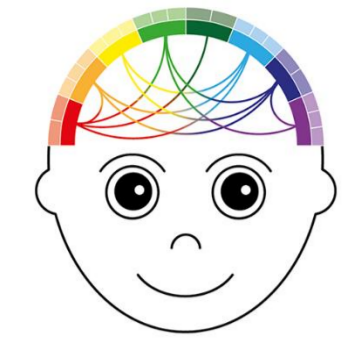


The effect of kinematic boundary cues on action sequence processing during infancy: An ERP study



Please visit the supplementary website www.matthilton.de/ICIS2020 for a more in-depth description of the background, experiment and analyses.

BACKGROUND

- We are interested in how infants process boundaries between individual actions of an action sequence.
- Work with adults suggests that kinematic cues (properties of the movement) can signal the location of boundaries in action sequences.^{1*}
- Two kinematic boundary cues are **pause** and **pre-boundary lengthening**.

RESEARCH QUESTIONS

- Are 12-month-old infants sensitive to kinematic boundary cues?
- Do kinematic boundary cues modulate processing of the subsequent action?

METHODS

- Stimuli: cartoon videos of an animated character performing a sequence of three actions (e.g. stretch then jump then turn).
- No-boundary trials** contained no kinematic boundary cues.
- Boundary trials** contained a boundary between the second and final action, signaled by pre-boundary lengthening and pause.
- 12-month-old infants ($N = 27$; $M_{age} = 11.7$ months; $SD_{age} = 0.7$ months; 48% girls) were presented with both trial types in a randomized order, while we recorded EEG.

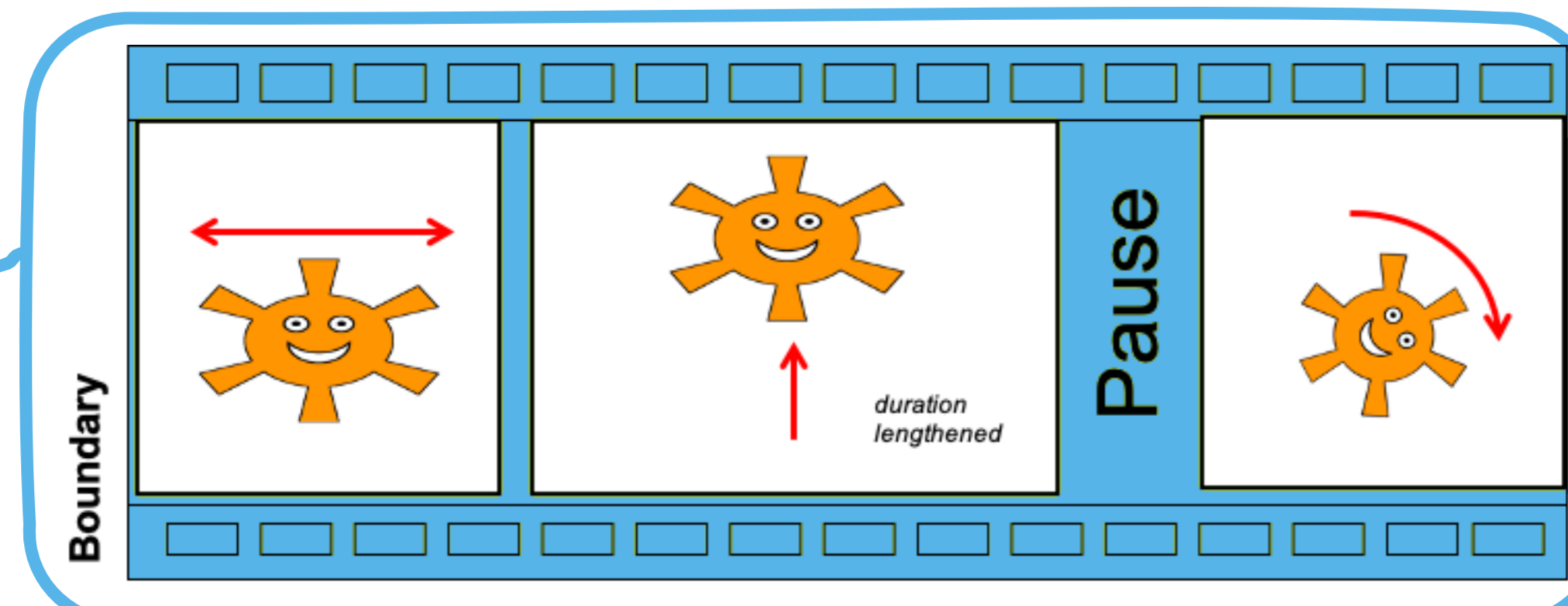
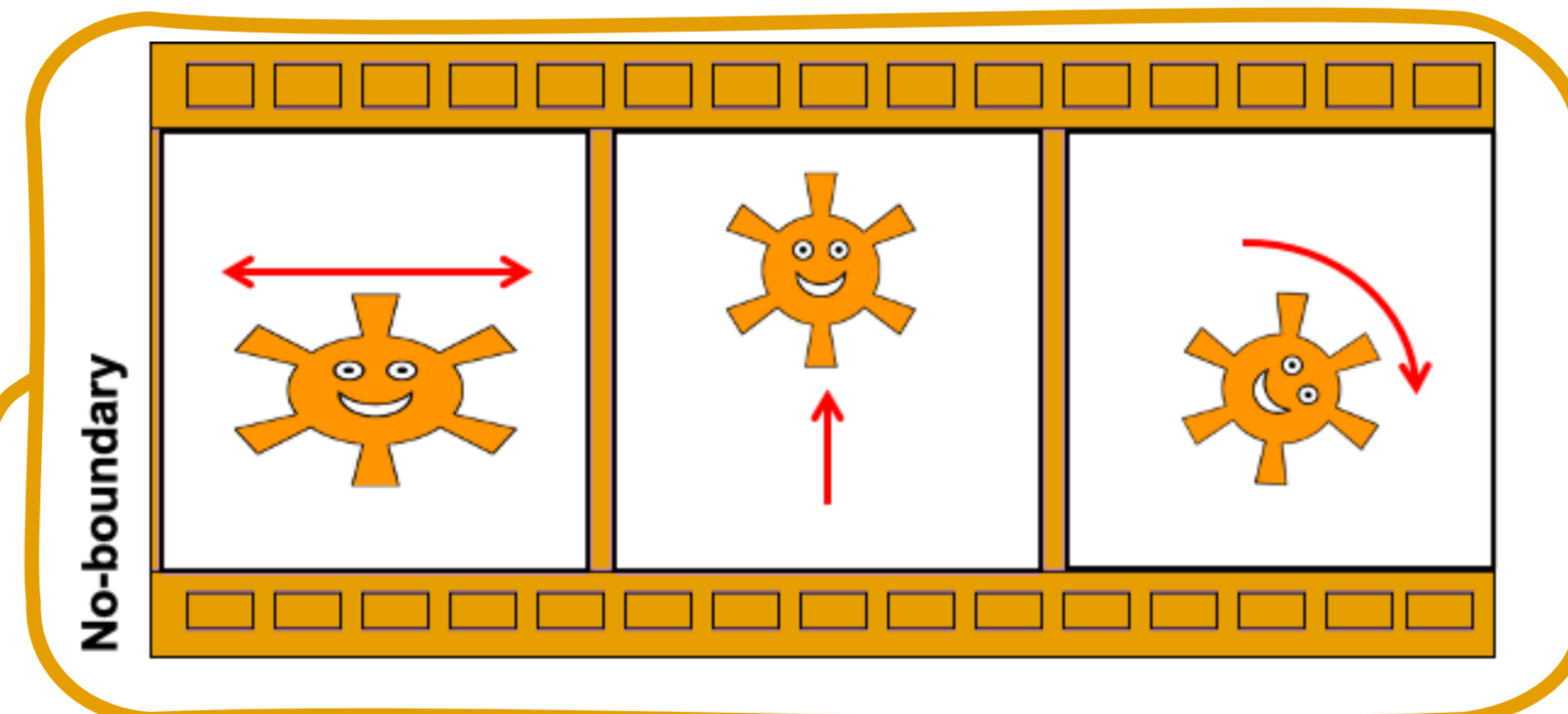
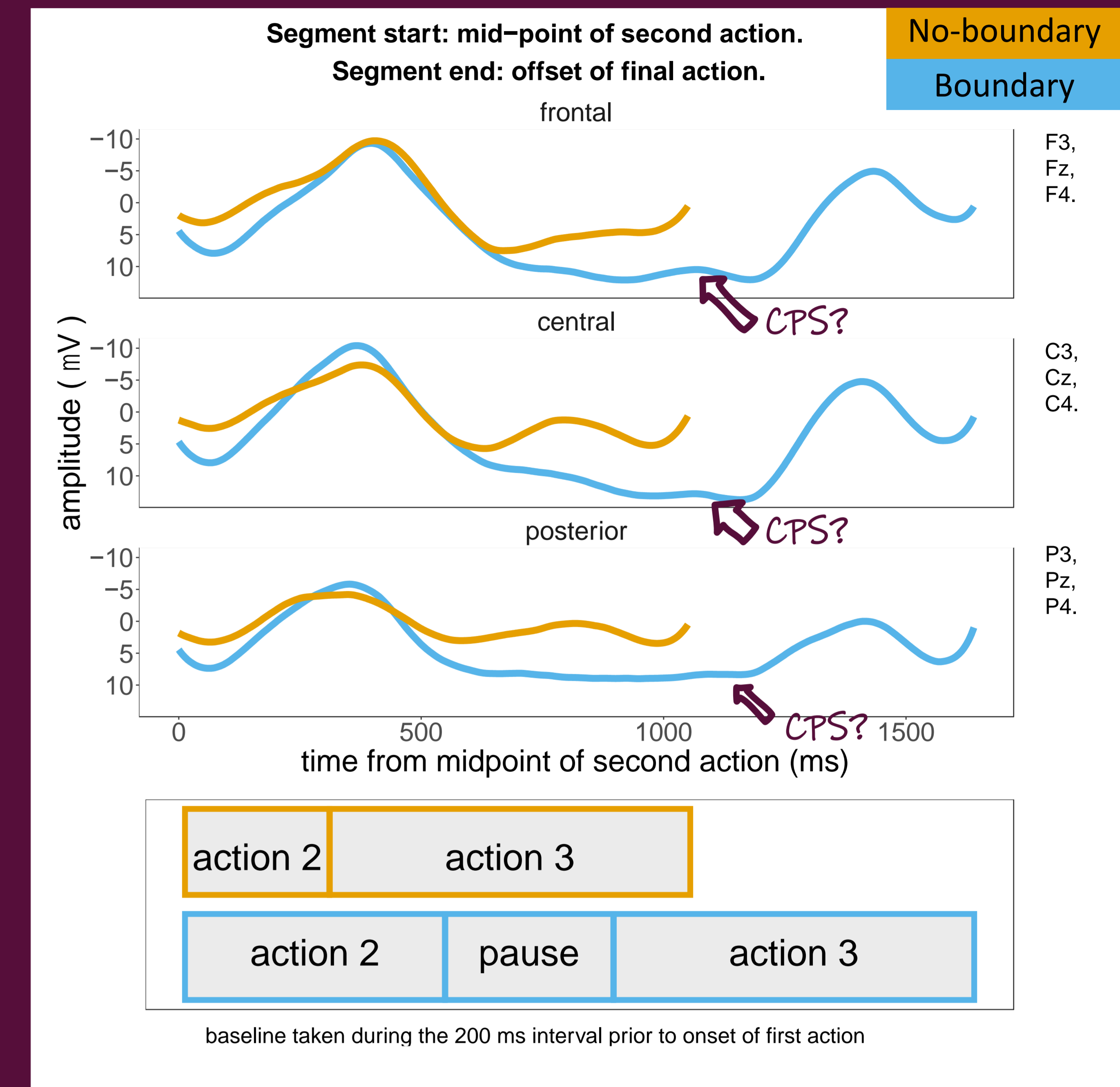
- The Closure Positive Shift (CPS): an ERP component initially discovered as a marker of processing prosodic boundary cues in speech.²
- CPS: a **broadly-distributed positive shift** in the ERP, beginning at the onset of boundary cues, and lasting approximately 500 ms.³
- Recently, the CPS has been found in 6-8-month-old infants as a response to prosodic boundaries in speech.⁴
- We have also found a CPS-like positivity in response to kinematic boundary cues in adults.¹
- This component likely reflects attentional/memory processes related to the segmentation of the action sequence.⁵

RESULT

- The onset of the pause is followed by a positive shift in the boundary condition across our three regions of interest.

CONCLUSION

- 12-month old infants are sensitive to kinematic boundary cues.
- Kinematic boundary cues evoke a similar EEG response as boundary cues in speech.



Matt.hilton@uni-potsdam.de
@Matthilton90

- The Negative Central (Nc) component is a marker of attention to and encoding of a stimulus.⁶
- Nc: fronto-central negative peak approx. 250-750 ms following stimulus onset.
- The Nc recently found to be related to action processing during infancy.⁷

RESULT

- We found an Nc-like component in response to all actions except the final action in the no-boundary condition.

CONCLUSION

- Kinematic boundary cues modulate encoding of the actions that follow.
- First evidence of a role of kinematic boundary cues in early action processing.

