Introduction

As infants improve their capacity to focus attention throughout the second half of their first year, they simultaneously master new motor skills.

Focused attention (FA) involves selective concentration, which is associated with an increase in effort necessary to process information about particular targets (Lawson & Ruff, 2001).

When effortful action imposes a cognitive load, cognition-action trade-offs are frequently elicited.

Therefore, maintaining control in balance-dependent postures taxes attention (Berger et al., 2017; Berger et al., 2019).

Objective

Examine how postural control relates to Focused Attention (FA) with varying degree of sitting experience.

Participants

72 infants, ages 6-8-month old infants (38 female: M = 7 months, 12 days; SD = 24 days; Range: 6 months, 2 days- 8 months, 25 days old) that can sit independently but not crawl. 67 out of the 72 participants reported sitting experience.

Methods

Parents set up a camera to record their infant’s Focused Attention (FA) and sitting skill (measured using Angles Video Goniometer©).

For the FA task, Infants explored three toys from three different categories for 90 seconds at a time while in two conditions: 1) supported in a highchair and 2) sitting independently on the floor.

FA is measured on a 5-point scale, from least to most activity (see Table 1).

Results

There were no significant differences between conditions (supported and unsupported) on the five outcome measures (Sum of Focused Attention bouts, Mean Focused Attention, Number of Focused Attention bouts, Longest Focused Attention bout, and Global Focused Attention). To find individual differences, we examined sitting experience and FA and found that surprisingly, differences in this skill were only related in the supported condition for four outcome measures and not at all for the unsupported.

Conclusion

We hypothesized that FA scores will be higher when infants are the supported sitting position than when infants are not supported. We did not find evidence for this. However, our second hypothesis was partially confirmed. Exploring the relationship between sitting experience and FA we found that, unexpectedly, differences in this skill were related only in the supported condition for four outcome measures and not at all for the unsupported. This unexpected result might have been driven by how sitting experience impacts attention. Less experienced infants probably used most of their attention for keeping balance leaving little attentional resources for FA, while, more experienced sitters might have spent less time in FA because they are used to attention sharing and able to process new information quickly. This study raises awareness of how the task’s level of demand affects the elicitation of trade-offs. This better explains infant development, object interaction, and the interaction of cognitive and motor systems.

References


Table 1. Operational Definitions of Primary Outcome Measures

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<thead>
<tr>
<th>Focused Attention Task</th>
<th>Operational Definitions</th>
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<tr>
<td>FA bouts - frames with all 3 criteria: simultaneous looking and manipulation of the toy, serious facial expression, decrease in extraneous body movements with duration ≥ 2s</td>
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<td>Longest FA - longest bout of sustained attention for each toy</td>
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<td>Total FA - duration of total FA, averaged over 3 toys</td>
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<td>Frequency of FA - number of FA bouts for each toy</td>
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<td>Global FA - qualitative 5 pt. scale (below), ranging from no interest in objects to long bouts of FA and reduced extraneous behaviors. GFA may capture several relevant variables in a single score</td>
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- Infants are investing energy in object exploration without clear evidence of FA
- Clear ability and inclination to attend to toys
- Greater proportion of the trial devoted to FA
- Exceptionally high level of object engagement, with clear and prolonged periods of absorption to the toy