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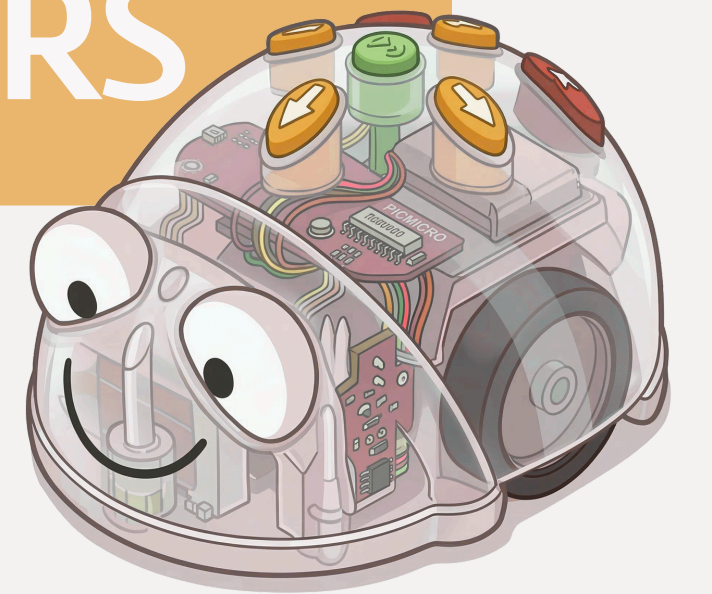


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# RELATIONSHIP BETWEEN EDUCATIONAL ROBOTICS AND EXECUTIVE FUNCTIONS IN CHILDREN WITH NEURODEVELOPMENTAL DISORDERS

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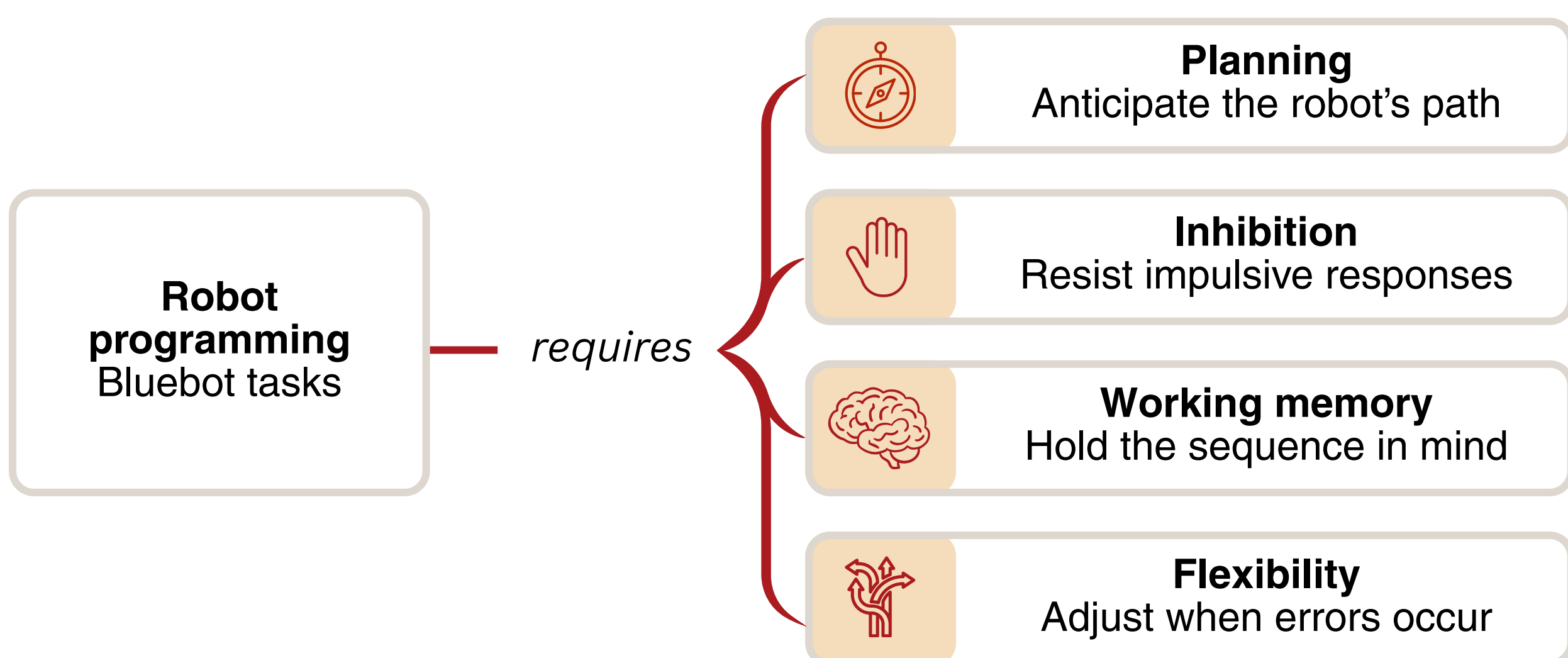
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## INTRODUCTION

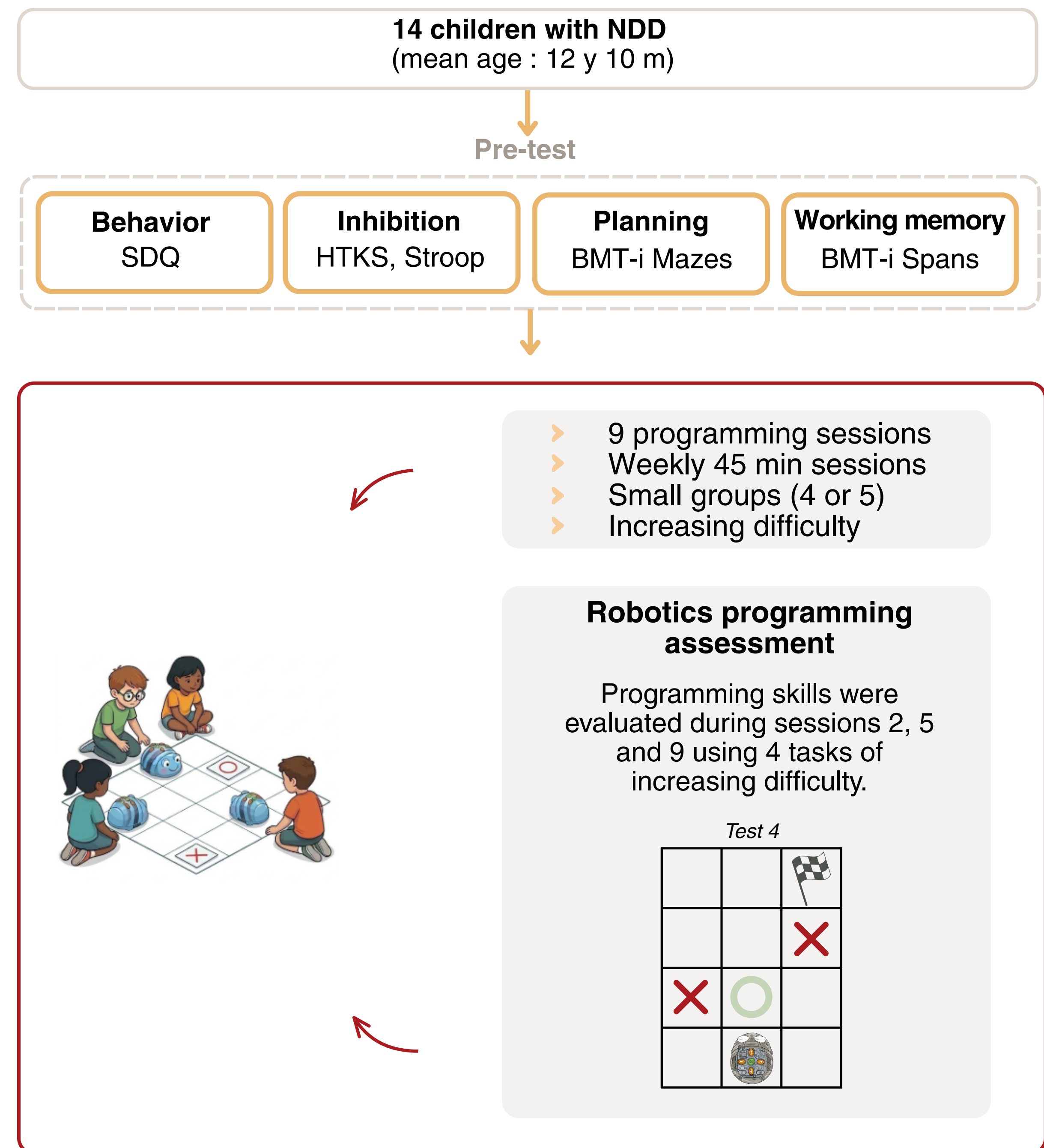
Children with neurodevelopmental disorders (NDD) require adapted and engaging learning environments. Educational robotics, where children program a physical robot to complete spatial tasks, has emerged as a promising tool (Pinabiaux et al., 2023).

Executive functions (Diamond, 2013) are core cognitive processes that appear closely linked to robot programming demands :



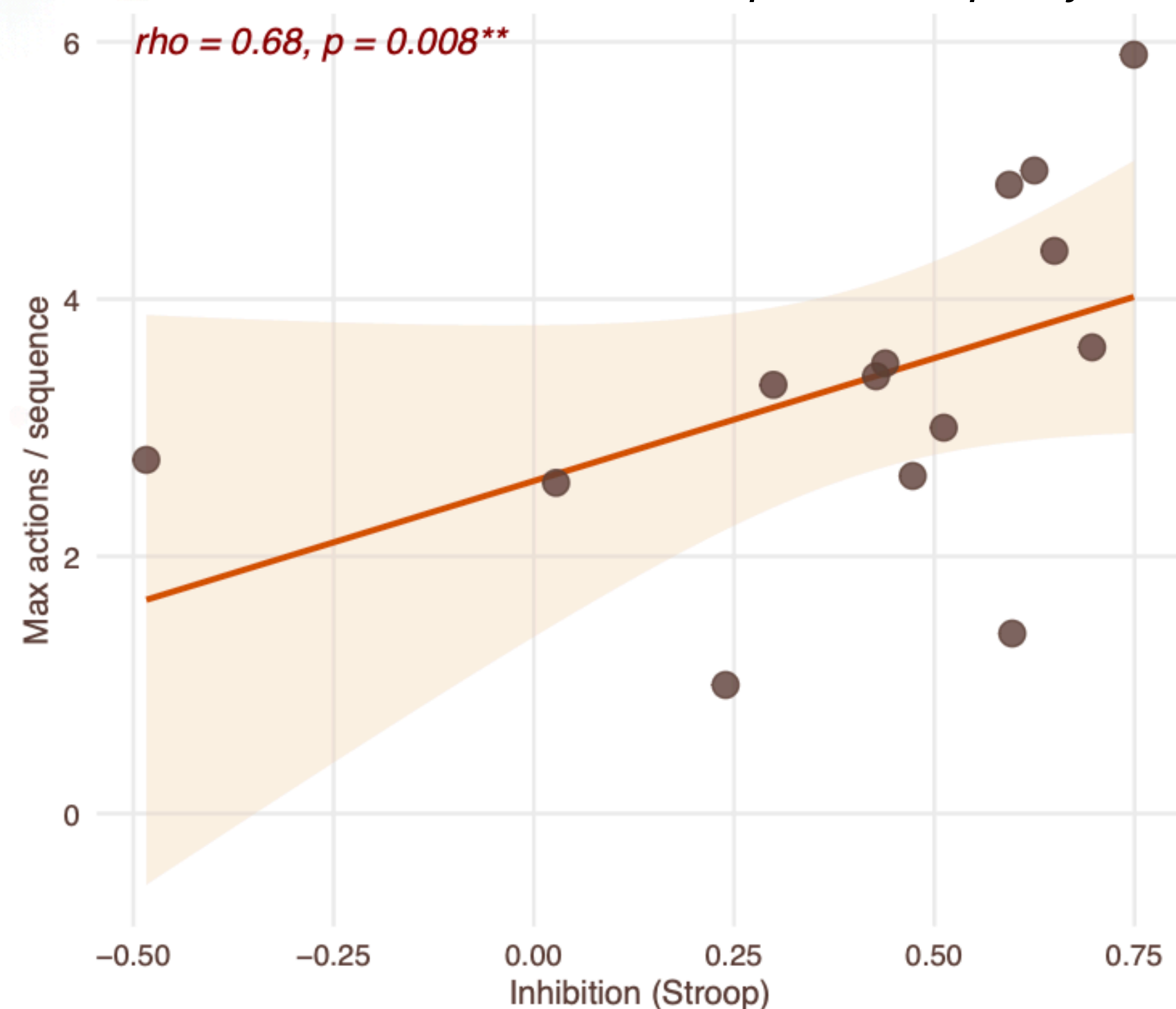
Positive effects on problem-solving and planning have been reported in typically developing children (Montuori et al., 2024), while studies with children with NDD suggest benefits for inhibition and attention (Di Lieto et al., 2020 ; Bargagna et al., 2019). However, no study has yet combined robotics programming with an explicit metacognitive component for children with ASD. This project investigates whether such an intervention leads to significant improvement in executive functions.

## METHOD

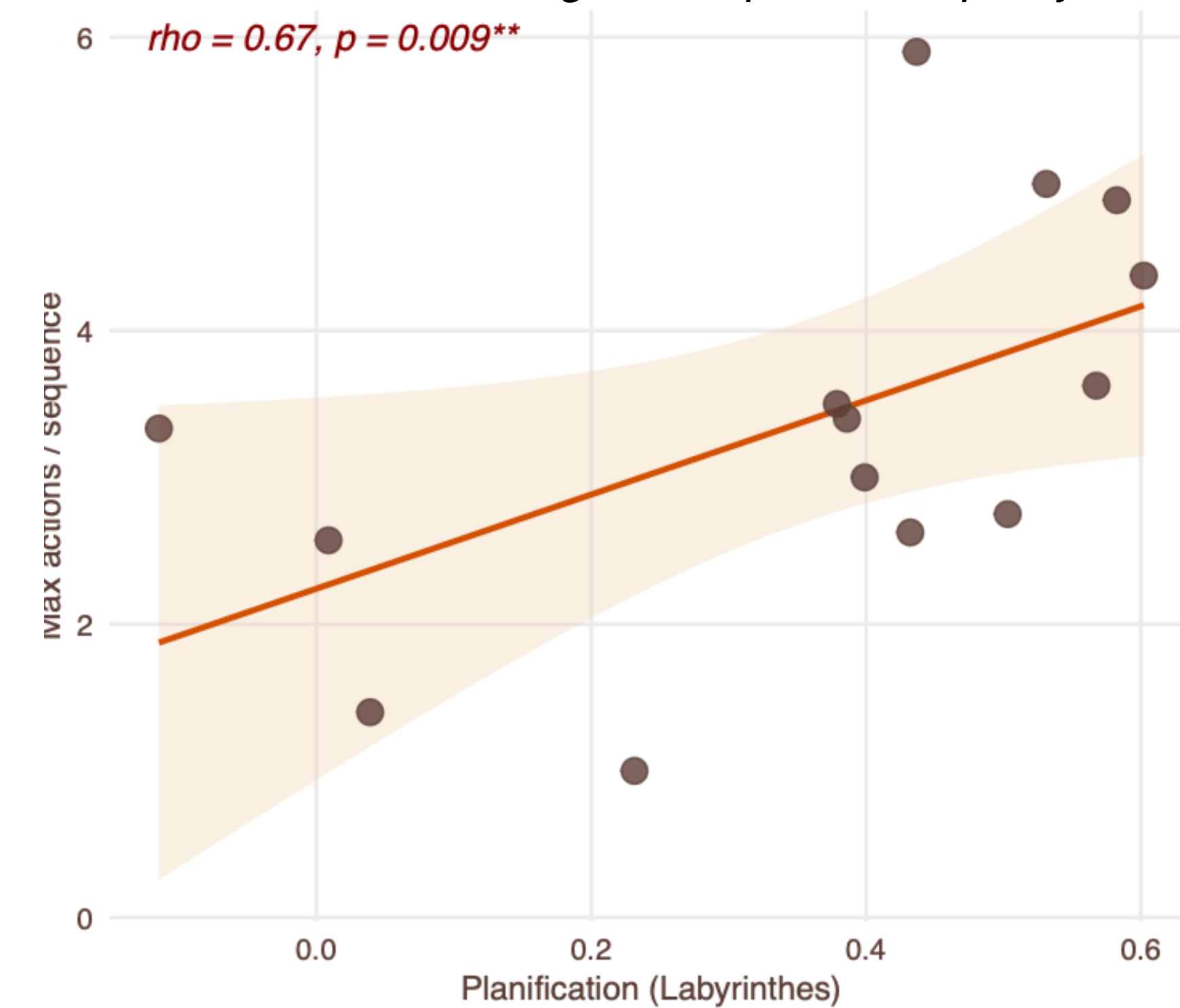


## RESULTS

**Figure 1.**  
Correlation between Inhibition and Sequence complexity



**Figure 2.**  
Correlation between Planning and Sequence complexity



Spearman rank correlations (N = 14) revealed significant positive associations between executive function scores and robotics programming complexity. Inhibition (Stroop task) and planning ability (Labyrinth task) were both significantly correlated with maximum actions per sequence ( $\rho = .68, p = .008$  and  $\rho = .67, p = .009$ , respectively). These results suggest that children with stronger executive functioning tended to produce more complex programming sequences on the BlueBot tasks.

## DISCUSSION

These findings support a meaningful relationship between executive functions and robotics programming performance in children with NDD. Stronger planning and inhibition abilities were associated with more complex programming sequences.

These results are consistent with previous findings linking EFs to robotics performance in typically developing children (Montuori et al., 2024) and extend them to children with NDD. The role of inhibition aligns with Di Lieto et al. (2020), who reported benefits of robotics interventions on inhibitory control.

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