INTRODUCTION

BACKGROUND

Objectives:

• To see if clear developmental transitions in task-switching performance and, if so, which manipulations drive them?
• To see how working memory interact with task switching performance over age?

METHODS

Study 1: Low Working Memory Demand

Participants:

• 60 children/adolescents, 30 female, ages 6-16 (M=11.36)
• 60 adults, 30 female, ages 18-27 (M=25.33)

Task:

• Nine levels of increasing difficulty via:
  • Response mapping (consistent, mixed, inconsistent)
  • Number of cueing tasks (2, 3, or 4)
  • Number of possible response choices (2 or 4)
• Levels 1 and 10 were identical to quantify short-term learning.
• 3 subgroups of congruency: 0%, 20%, 50% (20/20A each)

Study 2: High Working Memory Demand

Participants:

• 48 children/adolescents, 26 female, ages 6-16 (M=11.21)
• 48 adults, 22 female, ages 18-27 (M=20.11)

Task:

• Same manipulations as Study 1.
• To increase working memory load, the task indicator bar and response choice rows disappeared when the target appeared.

RESULTS

Overall: Children Were Slower And Less Accurate Than Adults

Switch-Costs Vary with Cognitive Load

High Demand: There was a significant two-way interaction between task switching and level manipulations for response times (p < .0001) and accuracy (p = .002). High Demand: There was no significant interaction between task switching and level manipulations for response times (p = .06) or accuracy (p = .05). There was no main effect of switching for RT.

Age-Related Improvement Later In High Demand Task

Task Improvement Within Child Group

CONCLUSIONS

• Age-related improvements in RT were gradual, but a shift in accuracy was observed around age 13 years in the low demand study and around age 14 years in the high demand study.
• We saw similar rates of short-term process improvement in both age groups and more improvement in the harder high demand study.
• Increasing working memory demand affected accuracy only at the hardest levels, while RT was slower at all levels.
• With practice, child RT was similar to initial adult RT in the low and high demand studies. We plan to explore the brain processing underlying these performance changes over age and practice.