Examining Behavioral Differences in Toddler Inhibitory Control

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Introduction

- Children's inhibitory control (IC) is important for social and academic competencies (e.g. McClellan et al., 2006)
- Grass-snow (G-S) is a task used in IC research (Carlson & Moses, 2001) requiring participants to inhibit a predominant response in favor of a subordinate response.
- Studies using G-S report scores based on correct responses; however, young children exhibit other behaviors during the task.
- Few studies have qualitatively examined IC tasks and few studies have examined IC development in young toddlers.
- This study uses an explanatory mixed methods design to examine toddler IC development and explain quantitative results with qualitative findings (Creswell, 2013).

Methods

Participants

- Total sample size of 57 (27 females, 30 males)
- Assessed at about 30, 36 and 42 months of age

Data collection

- G-S – children point to a green square when prompted "snow" and to a white square when prompted "grass" (maximum 14 trials)
- Task administration was video recorded and transcribed
- G-S proportion scores were calculated as number correct responses divided by total trials

Quantitative analysis

- Histograms (Figure 1) made of proportion scores grouped by age
- Spaghetti plots (Figure 2) of proportion scores were made with participants grouped by growth trajectory (upward, downward, curvilinear with up-peak, curvilinear with down-peak)

Qualitative analysis

- Criterion sampling used to select participants from different trajectories (5 children, 2 female, 3 male)
- Two research assistants (RAs) coded task videos using a codebook and consensus
- A third RA experienced in qualitative analysis reviewed codings and consolidated codes into themes (Table 1).

Findings

- Histograms showed nonnormal distributions of proportion scores (Figure 1). Although means and standard deviations are shown, they are inappropriate for nonnormal distributions.
- Spaghetti plots (Figure 2) suggested considerable individual differences in G-S performance over time. Plots grouped by descriptive differences in growth (upward, downward, curvilinear with an up-peak, curvilinear with a down-peak)

Figure 1

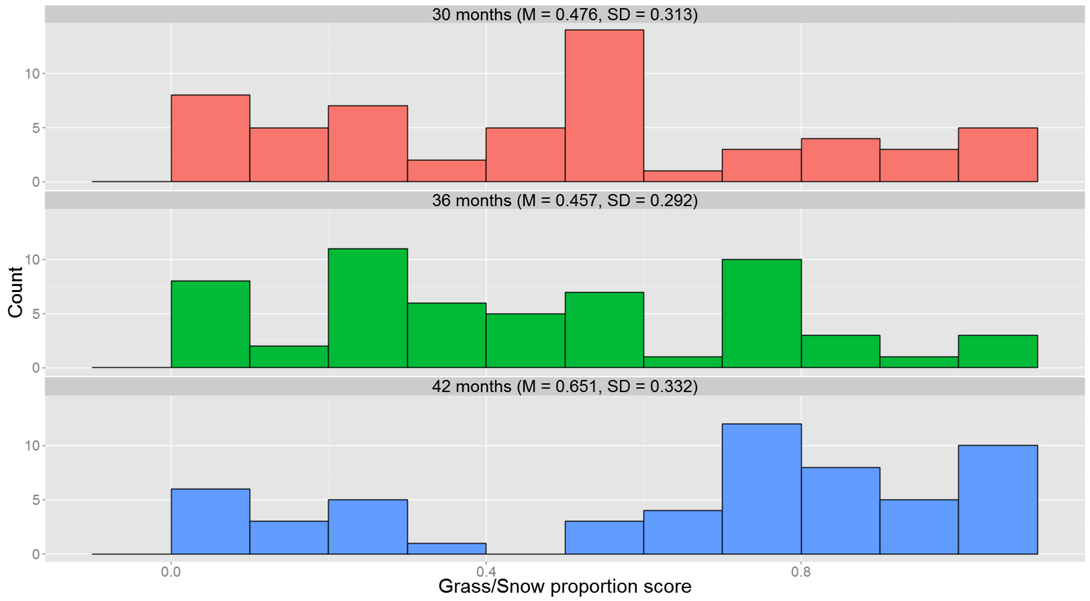

Figure 2

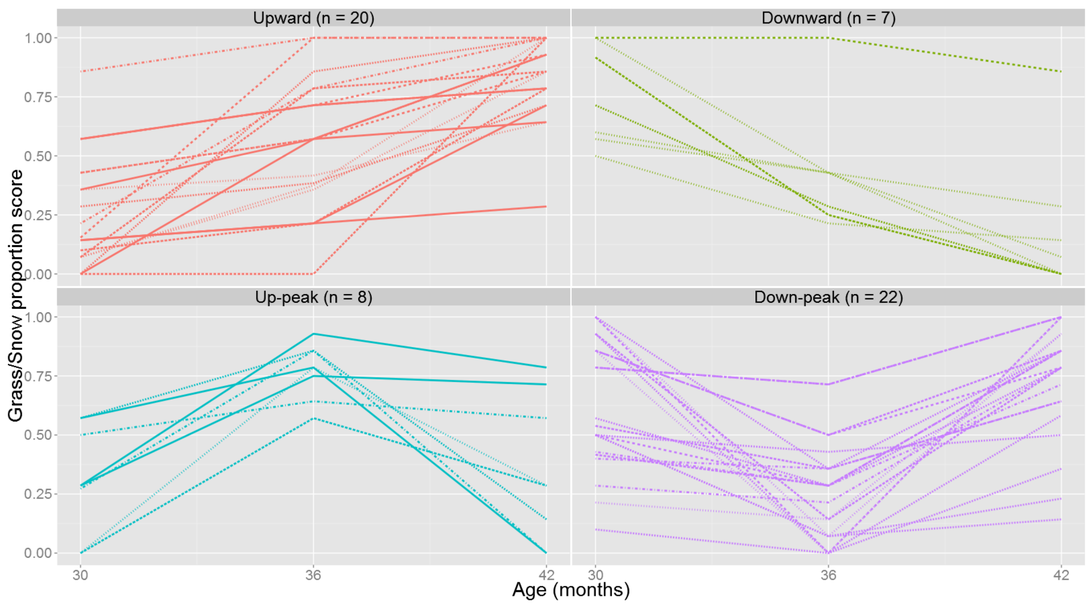

Table 1

Theme	Example	Findings
Vocalizations	Child parroting experimenter's vocalizations or prompts	Decreases as children get older across trajectory groups. Frequent vocalizations associated with lower scores
Inhibition behaviors	Child looking between options or stopping oneself from choosing the wrong square	Associated with higher scores across trajectory groups
Failures during practice	Touching wrong square during practice	Associated with lower scores
Correct responses during practice	Touching correct squares during practice	Increases as children get older across all trajectory groups. Not associated with scores
Incomplete responses	Not responding or responding after some delay	Decreased as children got older. Not associated with scores
Extraneous behaviors	Fidgeting, not attending to task, or engaging in some behavior unrelated to the task	Inconsistent across different trajectories, but overall decrease as children got older. Unassociated with scores

Discussion

- Extraneous behaviors such as fidgeting were inconsistent and may be unrelated to G-S performance.
- Higher scoring children tend to inhibit (e.g., stop and look between options) before committing to action.
- Failures during practice were related to low performance. However, successes during practice were unrelated to performance. Some children may be unable to transfer or maintain task rules in the absent of experiment guidance or feedback. Further research is needed.
- Implications for teachers and practitioners: Behaviors during task performance do not always relate to task success. Toddlers' developing IC may be expressed in different ways.