The Influence of Number of A-trials, Inhibition, and Language Ability In a Multistep Multolocation Search Task for Preschoolers
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Introduction

- Variants of the A-not-B search task are used successfully to study executive function (EF) in infancy and early childhood (Espy & Kaufmann, 2002; Marcovitch & Zelazo, 2009).
- The Hierarchical Competing Systems Model (HCSM) proposes that performance on the A-not-B task is guided by a habit based response system and a representational system (Marcovitch & Zelazo, 2006, 2009).
- The goal of this study was to examine two novel hypotheses postulated by the HCSM:
  - Perseveration will not be related to performance on inhibition tasks because no formal inhibition mechanism is hypothesized to guide behavior.
  - Higher verbal ability will be related to fewer perseverative errors because language promotes cognitive flexibility.

Method

Participants

- Forty-eight 3.5-year-old children (M age = 3.85 years, SD = .13) participated in the study.

Procedure

Age Appropriate A-not-B Search Task

- Children were taught the multistep procedure (see Figure 1).
- Children were asked not peek while the experimenter noisily wrapped a gift for them. Latency was recorded.

Inhibition Tasks

- Gift Delay Task (Kochanska, Murray, Jacques, Koenig & Vandecaste, 1996): Children were shown pictures that depicted day and night scenes and were asked to name the conflicting response (e.g., say night when shown the day card). Responses were recorded.
- Whisper Task (Kochanska et al., 1996): Children were asked to whisper the names when shown familiar and unfamiliar characters. Volume of whisper was recorded.
- Snack Delay Task (Kochanska et al., 1996): Children were asked to eat a snack placed under a clear container. Latency was recorded.
- Gift Delay Task (Kochanska, Murray, Jacques, Koenig & Vandecaste, 1996): Children were taught the multistep procedure (see Figure 1).

Measure of Current Language Ability

- Language ability was assessed using the PPVT (Dunn & Dunn, 2007).

Results

- Perseveration was defined as search that occurred exactly at location A when the object was actually hidden at location B.
  - A chi-square analysis revealed that the percentage of participants who made a perseveration error differed according to the number A trials, χ²(2, N=27) = 9.77, p<.05 (see Table 1).
  - Post hoc comparisons between the three conditions revealed a significant difference between children who received 1 A-trial and 6 A-trials, χ²(1, N=30) = 4.91, p<.05, and 1 A-trial and 11 A-trials, χ²(1, N=26) = 9.90, p<.01.
  - There were no significant correlations between perseveration on the multistep multilocation task and the inhibition measures (see Table 2).
  - There was also no significant correlation between perseveration on the multistep multilocation task and language ability (see Table 2).

Discussion

- In general, more experience on A-trials led to more perseverative errors.
  - This finding is consistent with other theories of perseverative search (e.g., the dynamic field theory; Thelen, Schönber, Scheier, & Smith, 2001).
  - Further, this finding appears to challenge non-monotonic predictions of the HCSM, but it is possible that 11 A trials in this particular task is not enough to elicit reflection.
  - As predicted, perseverative search on the multistep multilocation search task was unrelated to performance on inhibition tasks.
  - Although poor inhibitory abilities have been proposed as an explanation for perseverative behavior (e.g., Diamond, Cruttenden, & Neiderman, 1994), these results may support the lack of an inhibition mechanism in the HCSM.
  - Surprisingly, perseverative search behavior was unrelated to language ability.
  - It is possible that a task with higher verbal demands may reveal a relationship.
  - Performance on the PPVT is hypothesized to be related to new research applying linguistic labels as search aids in the multistep multilocation task.

References