



Perseveration following a temporal delay in the Dimensional Change Card Sort.

Anthony Steven Dick and Willis F. Overton
Temple University



Introduction

In the Dimensional Change Card Sort (DCCS), children sort test cards to target cards by one rule (e.g., color) in the pre-switch phase, and sort the same cards by a conflicting rule (e.g., shape) in the post-switch phase. Most 3-year-olds perseverate and continue to sort by the pre-switch rule in the post-switch phase (Zelazo, Frye, & Rapus, 1996; see Figure 1). Several explanations have been presented to explain this phenomenon, including

- a negative priming explanation, which forms a part of the Cognitive Complexity and Control Theory-revised (CCC-r; Müller et al., 2005; Zelazo et al., 2003),
- Attentional Inertia, in which children fail to inhibit the pre-switch stimulus attribute (Kirkham et al., 2003),
- an Active-Latent computational model, which specifies children's failure to resolve competition between graded active and latent memory traces (Morton & Munakata, 2002).

A recent finding is that perseveration continues to occur after a short time interval (i.e., ten minutes) between repeated post-switch phases (Müller et al., 2005). In other words, a short time between sorting sessions does not appear to help many children to shift. The present study investigated whether more extensive intervals of time (up to one week) would help children to shift in the DCCS.

Standard Version of the DCCS

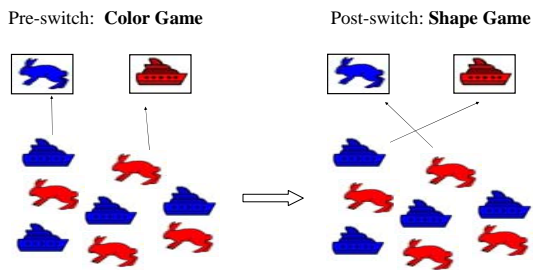


Figure 1. The standard version of the Dimensional Change Card Sort.¹

¹The stimuli shown are for the "color-rule-first". In the actual experiment, the rule presentation (color-first or shape-first) was counterbalanced.

The Present Study

Participants

Sixty children between 37 and 66 months ($M = 51.62$, $SD = 7.02$) were recruited. Children were randomly assigned to each of 4 conditions.

Design

Children were given the standard DCCS with a pre-switch phase, followed by a post-switch phase (see Zelazo et al., 1996). The pre-switch rules were given (e.g., "In the color game, all of the red ones go here, and all of the blue ones go here"), followed by two demonstration sorts. The children then sorted six test cards. Following this, they were given the post-switch rules (e.g., "In the shape game, all of the rabbits go here, and all of the boats go here").

The manipulation for the present study was the addition of a second post-switch phase following an interval of time. For post-switch B, children were simply given the post-switch rules and asked to sort the test cards accordingly.

There were four conditions, which differed by the interval of time between the two post-switch phases (see Figure 2):

- 10 Minutes
- 1 Hour
- 1 Day
- 1 Week

Finally, children received 4 knowledge questions.

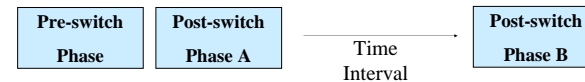


Figure 2. Each condition consisted of a pre-switch phase, a first post-switch phase (A), a time interval dependent on condition, and a second post-switch phase (B).

References

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Correspondence can be addressed to:
Anthony Dick, Dept. of Psychology, Temple University, Philadelphia, PA 19122
anthony.dick@temple.edu
www.temple.edu/psychology
Copies of the poster can be downloaded at:
<http://astro.temple.edu/~adick>

Preliminary Results

The majority of children passed both Post-switch A and Post-switch B. These children were generally older four-year-olds and five-year-olds ($N = 40$, $M = 53.8$ months, $SD = 6.12$). Of greater interest to the present study were children for whom: (a) the delay was not helpful (i.e., they failed A and failed B); (b) the delay was helpful (i.e., they failed A and passed B); or (c) the delay was harmful (i.e., they passed A and failed B). The preliminary results for these patterns are presented in Table 1.

Table 1.

The Numbers of Children Showing Each Pattern for Each Condition

	Fail A, Fail B	Fail A, Pass B	Pass A, Fail B
Condition			
10 Minutes	3	0	0
1 Hour	6	1	2
1 Day	2	2	0
1 Week	3	3	0

Discussion

The present findings have implications for several of the theories explaining children's difficulty with the DCCS.

- The active-latent model appears to predict, corresponding to the gradual buildup of memory traces, a gradual decay of memory traces. The model would need to be elaborated to account for the continued perseveration after a long delay.
- All present theories (e.g., including CCC-r and Attentional Inertia) must explain why the delay is not helpful for some children.
- ❖ An interesting possibility is that the *prior processing episode* is retrieved when the same stimuli are viewed (cf. Tipper, 2001). The results of the present study thus suggest a greater role for long term memory processes in executive function, and suggest several possibilities for future research.