

Generating Analogies to Stories: Investigating Young Children's Analogical Transfer

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Abstract—To test analogy generation's effect on analogical transfer in young children, 4-year-olds were read a story with a simple problem and solution and then were asked to generate an analogy to that story (Analogy Condition). A subsequent transfer problem was given to test children's understanding of the original story's solution. Performance was compared with groups that either summarized the original story (Summarize Condition) or that listened to two stories with the same underlying problems and solutions (Passive Condition). Results show that children in the Analogy and Summarize Conditions transferred the correct solution more often than children in the Passive Condition, but children in the Analogy and Summarize Conditions did not perform differently than each other.

Index Terms—Analogical Reasoning, Transfer, Young Children, Story Comprehension.

ANALOGICAL reasoning – the ability to map relevant relations of a base problem in order to solve a target problem – is pervasive in human thought. Even young children possess the ability to reason analogically, [1], however, young children are often distracted by problems' features while ignoring the relational structure that is important to analogical reasoning [2]. In this study, we investigated the extent to which relational reasoning could be facilitated in preschoolers.

Recently, Dunbar [3] describes a study with adults in which participants were more likely to be reminded of a story's relational structure after a week-long delay if they had generated an analogy to the story after initially reading it. This intervention has yet to be replicated with children. In the study described here we explored whether asking children to generate an analogy (Story B) to an initial story (Story A) would increase the frequency with which they could generate an analogical solution to a third story (Story C).

Thirty-seven 4-year-olds were randomly assigned to three different conditions and were told stories on two different days. Children in the Passive Condition listened to two stories on the first day. Children in the Summarize Condition listened

to one story on the first day and were asked to summarize it. Children in the Analogy Condition listened to one story on the first day and were asked to generate an analogy to it. On the second day, all children were presented with a Transfer problem in the context of a story and were asked to select 1 out of 5 pictorial objects that best solved the problem presented in the story. All stories were presented in story-book format and consisted of different characters and settings but had the same underlying problem and solution.

To ensure that children correctly summarized and generated analogies on day one, children were presented with pictorial cut-outs of the characters and objects and were asked to tell the same story they just heard with the cut-out characters (Summarize Condition) or to tell a new story like the story they just heard, but with new cut-out characters (Analogy Condition). If children did not provide the identical or analogous problem and solution, they were asked questions that probed them about the story's problem and solution.

The proportion of children who correctly selected the analogous solution object to the transfer problem on day 2 in the Passive Condition was .28, which was not different from chance ($p = .59$). Proportions for the Summarize and Analogy Conditions were .73, and .67, both significantly different than chance (p 's < .05). Significant differences were found between the proportion of children who provided the correct solution to the third story problem across conditions $\chi^2(2, N = 37) = 5.97$, $p = .05$. In particular, the Summarize and Analogy Conditions performed better than the Passive Condition $\chi^2(1, N = 25) = 4.8$, $p < .05$ and $\chi^2(1, N = 26) = 3.77$, $p = .05$ respectively, but were not reliably different from each other $\chi^2(1, N = 23) = .09$, $p = .75$.

Our preliminary results suggest that 4-year-olds exhibit difficulty in spontaneously abstracting the relational structure from two stories. However, children's analogical transfer benefits from interventions that have them summarize or generate an analogy to a story. More research will be needed in order to precisely determine the mechanisms underlying transfer in the Summarize and Analogy Conditions.

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