Remembering Stories
A Comparison of Young Males with Fragile X Syndrome and Typically Developing Males

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Study Questions
■ Do young males with FXS differ from younger typically-developing males in their memory for stories?
  o Do young males with FXS differ from younger typically-developing children in how well they can use pictures as memory aids?

Results
■ A MANOVA tested for differences by group (did the boys with FXS differ from the typically-developing boys) and for test (WRAML versus Bus Story) and for interactions
  o See Figure 1
  o There was a significant interaction between group and test (F(1,31) = 20.29, p < .0001)
  o Boys with FXS performed equally on the Bus Story and WRAML
  o They remembered 17% of the details from the WRAML and 18% of the details from the Bus Story
  o TD boys did better on the Bus Story (remembering 19% of all items) than on the WRAML (13% of items)
  o The two groups did not differ on the WRAML which required them to remember the story without pictures
  o They did differ on the Bus Story which provided pictures as clues to the story

Discussion
■ When listening to a story, without pictures, both groups remembered about 20% of the details
  o Thus, the boys with FXS demonstrated equal short-term memory to that of the developmentally matched boys

However, the typically-developing boys were able to use the pictures in the Bus Story as memory cues, that helped them remember almost 40% of the details
  o In contrast, the boys with FXS did not appear to use the pictures as memory aids, and showed no improvement on the Bus Story

Future research should test if boys with FXS can be taught to use pictures to help them remember details
  o The typically-developing boys used the pictures to aid them, without the adult needing to tell them to do so
  o Boys with FXS may need direct teaching that pictures can help them remember stories

Abstract
The ability to remember the main points of a story is a skill often tested in reading and literacy classes. This skill has bases in both language abilities (e.g., the ability to understand the sentences that comprise the story, the use of narrative skills to parse the story) and more general cognitive skills (e.g., short term memory, working memory, the use of mnemonics). As part of a five-year longitudinal study of young males with fragile X syndrome, we assessed two types of story memory: stories read and retold in isolation. Each child completed the story retell both with pictures and without pictures. Given that the children had comparable general cognitive skills, would the two groups show equal performance on the two tasks? Are the children able to use the pictures to cue their recall of the story?

Fragile X Syndrome (FXS)
■ Most common inherited cause of mental retardation in males (1 in 4,000)
■ Specific deficits in memory and language domains
  o Difficulties reported for short-term memory
  o Delays in global and specific language skills
  o Unclear if delays in memory and language are equal to or greater than impairments in general cognitive abilities

The Importance of Story Memory
■ Provides alternative way to assess short-term memory skills
  o Test memory within a context
  o Most short-term memory tests involve remembering random sentences
■ Foundation for reading and literacy skills

Participants
21 males with fragile X syndrome (FXS)
  o Full-mutation for FXS
  o Average chronological age was 11 years, 2 months
  o Average developmental level of 5 years, 5 months
  o 13 typically-developing males (TD)
  o No known disabilities or delays
  o Average chronological age was 11 years, 3 months
  o Average developmental level of 5 years, 5 months

Measures
■ Wide Range Assessment of Memory and Learning (WRAML)
  o Story memory subtest
    - Two short stories (a birthday party and going fishing) were read (5 to 7 sentences long each)
    - Child was asked, “Now tell me the story. Try to remember all the parts.”
    - Score is total number of details remembered from both stories (sum) divided by the total possible details
  - Renfrew Bus Story
    - Children heard a short story (15 sentences) describing the actions of a bus
    - While listening, they were shown 12 pictures that went with the story
    - At the end of the story, they were asked, “Now you tell me the story. Once upon a time there was a …
    - Score is the total number of details remembered divided by the total possible details

Table 1 Children’s Performance on the Bus Story and WRAML

% Details Remembered

<table>
<thead>
<tr>
<th></th>
<th>Bus Story</th>
<th>WRAML</th>
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<tbody>
<tr>
<td>FXS</td>
<td>0.20</td>
<td>0.18</td>
</tr>
<tr>
<td>TD</td>
<td>0.39</td>
<td>0.37</td>
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