

## Two Native English Speaking Children's Comprehension and Memory for Prose

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The purpose of this project is to observe two native English speaking children's comprehension and memory and how much a child's comprehension and memory improved over a year.

As concerns memory, I wanted to observe whether the surface structure or the deep structure of the prose was retained more clearly in their memory. I also wanted to observe how much more a boy's working memory had developed a year later, and if his permanent memory influenced his working memory.

David Carroll cites that "*Transformational grammar distinguishes between two levels of sentence structure, a deep structure that represents the information needed to interpret the sentence semantically and a surface structure that incorporates the information needed to pronounce the sentence.*

*Working memory (also known as short-term memory) holds information that is currently occupying our attention. The contents of working memory are in an active state and are nearly synonymous with immediate consciousness and awareness.*

*Permanent memory (also called long-term memory), which is a repository of our knowledge of the world. This includes general knowledge, such as the rules of grammar or of arithmetic, along with personal experiences, such as memories from your childhood. Permanent memory holds all of the information we have retained from the past that is not currently active. These memories are used to interpret new experiences, and, in turn, the new events may later be added to this storehouse of information.* (David W. Carroll, 1986 Psychology of Language pp.44,46,47)

Two children participated in this project. They are brothers, Bobby and Tommy, native English speakers who were born and lived in California. Their parents are native English speakers. Their father has a Ph.D. in nuclear engineering and their mother was an X-ray engineer. After Tommy was born, she quit working to stay at home to take care of her children. She took her sons to museums, the aquarium, the zoo and concerts often. While she was taking a walk with them, she told them the names of flowers, plants or insects. She also read various books for them often. She did volunteer work as a book reader at the kindergarten where Bobby attended.

At the first observation, Bobby was five years and four months old and attended kindergarten. A year later, Bobby was still at kindergarten. At Tommy's first observation, he was eleven years old, attending a public elementary school.

### [ 1 ] Hypotheses:

Hypothesis 1. The first hypothesis is that Bobby's working memory of the prose would be

improved a year later because his of learning experiences through his everyday activities such as learning at his kindergarten, listening to stories, watching T.V. programs and playing with his friends must have accumulated over the course of a year. All these experiences must have helped him to understand the stories better as heuristic processing.

Hypothesis 2. The second hypothesis is that in Bobby's and Tommy's memory, deep structures would be retained more clearly than surface structures because when we listen to or read sentences, we understand the deep structures of the sentence rather than the surface structures of the sentences.

Hypothesis 3. The third hypothesis is that as Bobby had listened to the same story a year prior, he would produce the prose better because he kept the theme or idea or meaning of the prose or the part of the prose in his permanent memory.

Hypothesis 4. The fourth hypothesis is that both Bobby and Tommy would produce the Western prose better than the Japanese prose because the Western prose was familiar to them.

[ 2 ] Procedure:

(1) The first observation of Bobby at 5 years and 4 months old.

Bobby listened to a part of the story, Winnie the Pooh and Tigger Too, which was taped by a professional story teller.

The story was:

*This is Winnie the Pooh, a teddy bear who belongs to a boy named Christopher Robin.*

*Pooh has many friends in the Hundred Acre Wood.*

*One of them is a bouncy character with stripes.*

*"Hi. I'm Tigger. T-I-double 'G'-ER."*

*"I know," said Pooh. "You've bounced me before."*

*Tigger likes to bounce on people. One day he saw Piglet sweeping some leaves into a pile. He gave Piglet a good bounce. All the leaves went flying.*

*"Shucks, that's only a little bounce," said Tigger. "I'm saving my best one for Rabbit." And Tigger bounced over to Rabbit's house.*

(Take-A-Tape Along Walt Disney Story Teller Walt Disney Productions)

After Bobby listened to the passage, I asked him what he had listened to. He didn't say anything. Therefore, I asked several questions about the passage.

(Question 1.) What is the teddy bear's name?

(Bobby) "Winnie the Pooh."

(Question 2.) Who has the Winnie the Pooh?

(Bobby) "I don't know. .... Tom."

(Question 3.) Where does Pooh have many friends?

- (Bobby) "....."
- (Question 4.) What is the tiger's name?
- (Bobby) "Uh."
- (Question 5.) What was Piglet doing?
- (Bobby) "....."
- (Question 6.) What did Tigger give Piglet?
- (Bobby) "Bounce."
- (Question 7.) What happened to the leaves?
- (Bobby) "Flew over."
- (Question 8.) Did Tigger give a big bounce to Piglet?
- (Bobby) "Rabbit."

[Analysis 1]

Bobby neither comprehended nor produced the story at all but he remembered the full name of "Winnie the Pooh." He didn't remember who owns this Winnie the Pooh in the story, therefore, he answered "I don't know" to the question which was "Who has the Winnie the Pooh?" But shortly after, Bobby remembered that his brother, Tommy, had a stuffed Winnie the Pooh toy, so after he answered "I don't know," he answered "Tom." It shows that Bobby had mixed up his real life and the story. Bobby didn't answer three questions. He kept silent for two questions and he said only "Uh" to one question "What is the tiger's name?" Bobby remembered a part of the story. For example, that Tigger gave a bounce to Piglet, and the leaves went flying. Moreover, Bobby guessed that Tigger would give a big bounce to Rabbit from "I'm saving my best one for Rabbit." Bobby didn't produce full length of the sentences but he produced the same word which is "bounce" from the story. He changed "went flying" to "flew over." It shows that Bobby remembered the meaning of "went flying" instead of its surface structure, moreover; the past tense was the same as the story.

(2) The second observation of Bobby at 6 years and 4 months old.

A year after Bobby's first observation. Bobby listened to the same story: Winnie the Pooh and Tigger Too.

After Bobby listened to the passage, I asked what he had listened to.

He produced the story.

*Winnie the Pooh. Pooh has many friends in the Hundred Acre Wood.  
One is an animal with black stripes. He likes, his name is Tigger.  
One day, Tigger was out bouncing. He saw a Piglet. He gave him a bounce.  
That wasn't a big bounce. That was a small bounce.  
All the leaves went flying.  
That was not a big bounce. That was a small bounce.  
I'm saving my best one for Rabbit.  
And Tigger bounced over to Rabbit's house.*

[Analysis 2]

Bobby's comprehension and memory increased dramatically in a year. At his first observation, he neither comprehended nor produced the story at all but a year later, he comprehended and produced the story very well. This might be because he had listened to the same story the previous year. Therefore, he could understand the story well. Through his production, it was observed this time that surface structures were retained in Bobby's memory as well as deep structures. For example, the structures such as "Pooh has many friends in the Hundred Acre Wood," "All the leaves went flying," "I'm saving my best one for Rabbit," and "And Tigger bounced over to Rabbit's house," are the same surface structures as the story. It was also observed that meanings were retained in Bobby's memory clearly. For example, his productions "That wasn't a big bounce," and "That was a small bounce" came from "That's only a little bounce." Their deep structures are the same but he produced "small" in "That was a small bounce" instead of "little."

Some words show Bobby's experiences from his permanent memory. For example, Bobby produced "animal" and "black" even though these words are not found in the passage. Bobby realized that Winnie the Pooh's friends must be "animals" and "tiger" must have black stripes. His knowledge of words could only have come from his experiences.

(3) The third observation of Bobby at 6 years and 4 months old.

I asked the same questions which I had asked him the previous year about the passage.

(Question 1.) What is the teddy bear's name?

(Bobby) "Winnie the Pooh."

(Question 2.) Who has the Winnie the Pooh?

(Bobby) "Christopher Robin."

(Question 3.) Where does Pooh have many friends?

(Bobby) "In the Hundred Acre Wood."

(Question 4.) What is the tiger's name?

(Bobby) "Tigger. T-I-double G-ER."

(Question 5.) What was Piglet doing?

(Bobby) "Raking leaves in the pile."

(Question 6.) What did Tigger give Piglet?

(Bobby) "A bounce. A small bounce."

(Question 7.) What happened to the leaves?

(Bobby) "Flew over."

(Question 8.) Did Tigger give a big bounce to Piglet?

(Bobby) "No, he is saving the best one for Rabbit."

[Analysis 3]

Bobby answered all eight questions correctly. He remembered personal names such as "Winnie the Pooh," "Christopher Robin," "in the Hundred Acre Wood" and "Tigger,

T-I double G-ER" very well. He also remembered the surface structure of the sentence "he is saving the best one for Rabbit" from "I'm saving my best one for Rabbit."

He produced "A small bounce" both at the first and the second observations instead of "a little bounce." He also remembered the meaning of sentences such as "Raking leaves in the pile" from "Piglet sweeping some leaves into a pile." Moreover, he remembered the meaning of "went flying" and "a little bounce," although he produced "flew over" and "a small bounce." At both the first and the second observation, he produced "flew over" instead of "went flying." He understood the meaning of "went flying" and "a little bounce" but it might be easier for him to produce these phrases as "flew over" and "a small bounce."

(4) The fourth observation of Bobby at 6 years and 4 months old.

Bobby also listened to a part of the Japanese fairy tale, Peach Boy, which was read by his mother who is a native English speaker. It was the first time that Bobby had heard the story.

The story was:

Peach Boy

*Once upon a time, there was an old man and his old wife living in the country in Japan. The old man was a woodcutter. He and his wife were very sad and lonely because they had no children.*

*One day the old man went into the mountains to cut firewood, and the old woman went to the river to wash some clothes.*

*No sooner had the old woman begun her washing than she was very surprised to see a big peach come floating down the river. It was the biggest peach she'd ever seen in all her life. She pulled the peach out of the river and decided to take it home and give it to the old man for his supper that night.*

*Late in the afternoon, the old man came home, and the old woman said to him: "Look what a wonderful peach I found for your supper." The old man said it was truly a beautiful peach. He was so hungry that he said: "Let's divide it and eat it right away."*

*So the old woman brought a big knife from the kitchen and was getting ready to cut the peach in half. But just then there was the sound of a human voice from inside the peach. "Wait! Don't cut me!" said the voice. Suddenly the peach split open, and a beautiful baby boy jumped out of the peach.*

After Bobby listened to Peach Boy once, he produced the story.

*Once upon a time, there was an old man and woman.*

*And old man, he like cut the wood.*

*And old woman wash clothes.*

*One day, they were very lonesome.*

*One day, the old man went out wood cutting.*

*And the old woman went to wash clothes.  
She didn't want to strong because peach floating cross to the river.  
She picked it up. She decided to take it home.  
The old man was waiting.  
Just then, she went to get a knife from the kitchen.  
She was about to cut it open when just she heard the human voice from inside.*

[Analysis 4]

Even though the story, Peach Boy, was an old Japanese fairy tale and it was a new experience for Bobby to listen to a Japanese story, he comprehended and produced the story very well. It was observed that some surface structures were retained in Bobby's memory. For example, he remembered the part of the surface structures such as "Once upon a time there was an old man and ....," "One day, the old man went into to ...," "and the old woman went to..... to wash clothes," "..... decided to take it home," "Just then" and ".... and a .... knife from the kitchen." On the other hand, deep structures were retained in Bobby's memory more clearly than surface structure. For example, his productions "an old woman" which was produced as the first sentence came from "his old wife," "he like cut the wood" might come from "a woodcutter," "They were very lonesome" came from "He and his wife were very sad and lonely," "Wood cutting" came from "to cut firewood," "to wash clothes" came from "to wash some clothes," "peach floating cross to the river" came from "a big peach come floating down the river," "She picked it up" came from "She pulled the peach out of the river," "she went to get a knife" came from "the old woman brought a big knife" and "she heard the human voice from inside" came from "there was the sound of a human voice from inside the peach." His productions show that Bobby changed the surface structures but picked up meanings. However, he didn't produce the third person singular "s" in "he like cut the wood" and "And old woman wash clothes."

If I compare Bobby's production of Winnie the Pooh and Tigger Too which he produced when he was five years and four months old, his production of Winnie the Pooh and Tigger Too was far better a year later both in surface structure and deep structure of the story. Even though Bobby had listened to Winnie the Pooh and Tigger Too a year ago and had not had any chance to listen to the same story again for a year, he must have put a part of the meaning of the story and a part of structure of the story into his permanent memory. Therefore, even though he listened to the story again a year later, his permanent memory might have influenced his working memory to produce the story.

(5) The first observation of Tommy at 11 years old.

Tommy read a part of Winnie the Pooh and Tigger Too.

The story was:

*When winter came the Hundred Acre Wood was covered with snow.  
Roo was so anxious to play with Tigger that his mother, Kanga, could barely get his scarf on.*

*"I'll take care of the little nipper, and have him home by nap time," Tigger promised. Then off they bounced, because "That's what Tiggers and Roos do best!" They came to a beautiful frozen pond in front of Rabbit's house. There was Rabbit, happily, ice skating. Roo asked Tigger, "Can Tiggers skate as fancy as Mr. Wabbit?" "Sure, Roo. That's what Tiggers do best!" But when Tigger ran onto the ice, he slipped and skidded right into Rabbit, and they all went crashing right through Rabbit's front door. Tigger grunted, "Tiggers don't like ice skating!"*

(Take-A-Tape Along Walt Disney Story Teller Walt Disney Production)

I asked Tommy "What did you read?" He answered "I can't memorize the book."

After his mother, Gloria, told him, "Tell the general idea" he produced the story.

The Hundred Acre Wood was covered with snow when winter came.

Tigger took Roo skating and bumping into Rabbit through right into Rabbit's front door.

Roo so excited to play with Tigger so then Kanga that can hard to scarf on him.

Roo ask Tigger if he could skate as fancy as Mr. Rabbit.

So then Roo said that Tigger do the best so he ran right into Rabbit.

He hit to Rabbit's front door.

[Analysis 5 ]

Tommy's production of the prose was not in order but he could comprehend the prose well. In his first production "The Hundred Acre Wood was covered with snow when winter came" the deep structure is the same as the prose and its surface structure is almost the same as the prose, except the adverb clause "when winter came" was produced as the last part of the sentence.

He produced "Roo so excited to play with Tigger so then Kanga that can hard to scarf on him" from "Roo was so anxious to play with Tigger that his mother, Kanga, could barely get his scarf on." Tommy changed "was so anxious" to "excited" and "could barely" to "can hard." Their meanings are the same but the tense is different in "can hard" instead of "could barely." He produced "Roo ask Tigger if he could skate as fancy as Mr. Rabbit" from "Roo asked Tigger, 'Can Tigger skate as fancy as Mr. Wabbit?'" Small children usually pronounce "wabbit" instead of "rabbit." Tommy had read the words "Mr. Wabbit" but he changed it to "Mr. Rabbit." He produced "ran" instead of "skidded" in "...he ran right into Rabbit." He also produced "hit" instead of "went crashing" in "He hit to Rabbit's front door."

He understood the meaning of "anxious," "barely" and "skidded" but it might be easier for him to produce "excited," "hard" and "ran."

(6) The second observation of Tommy at 11 years old.

Tommy read an old Japanese fairy tale, the Fairy Crane. It was the first experience for

Tommy to read a Japanese story.

The story was:

The Fairy Crane.

*Once upon a time there was an old man who lived in the country all alone with his old wife. They had no children. One day, the old man was walking along the road beside a rice field when he suddenly heard a strange sound: "Flutter, flutter, flap, flap." Following the sound, he discovered a beautiful white crane caught in a snare. He said, "I will help you out." He set the crane free, and it flew away into the sky.*

*After the old man got home and was telling his wife about the crane, a knock came at the door and someone said in a sweet voice: "May I come in?" The old woman opened the door and there she found a pretty, dainty little girl.*

*The little girl said: "I have lost my way. Please let me stay in your house tonight."*

*The old people were very happy to have such a pretty girl in their house. And when she told them that she had no parents of her own, they asked her to become their daughter and live with them always. So the little girl stayed on with them.*

*One day the girl said to her new parents: "If you'll promise not to look at me even once while I work, I'll weave some cloth on the loom in the weaving room."*

*Thereafter they could hear the sound of the loom every day "Ton-ka-ra-ri, ton-ka-ra-ri" and every night their little girl gave them a beautiful piece of cloth which she had woven that day. It was the most beautiful cloth in the whole world and all the neighbors came to see it.*

*The old woman became more and more curious. She said to herself: "How in the world can this little girl weave such beautiful cloth?" So finally one day she peeked into the weaving room.*

*What a strange sight she saw! There, sitting at the loom, was not her little daughter but a beautiful white crane, using its own soft white feathers to weave cloth!*

*That night when the old man came home, the little girl came out of the weaving room and said: "I am the crane that you saved. I have been weaving cloth to repay the kindness you did for me that day long ago. But now that you have discovered my secret, I can no longer stay with you."*

*The old woman was sorry she had peeked, and the old man was in tears, but since they knew their daughter was actually a crane, they finally understood that she must go back to her home in the sky.*

*"Goodbye, good luck," the girl said. And then suddenly she changed into a white fairy crane and soared gracefully up into the sky on her beautiful white wings.*

After Tommy read the story, he produced it:

One time there was an old man who lived in country.  
He was walking on. And then, there were sounds.  
Ok. One he said "Oh, poor thing. I'll help you out."  
He set the crane free and it flew away into the sky.  
After the old man got home, he was telling his wife all about the crane what it is.  
Then, his wife heard a knock at the door. So she answered it.  
There was a beautiful girl. And she said, "I'm lost. May I stay with you?"  
And they said "Surely." They were very glad with such a pretty girl in the house.  
So, the girl said "I have, I don't have any parents."  
They said "Ok." So, now on she stayed with them.  
Ok. One day the girl said to her parents "Promise me not to look at me even I was working."  
Beautiful cloth. Some clothes in the room, in the weaving room.  
The door was locked. There was sounds every day. Tonkachi, tonkachi.  
Every night, the girl gave them the beautiful piece of cloth.  
One day, while she was working, the old lady got so curious and she peeked in.  
And so then, after that when the old man got home, the woman said, I mean, the girl  
said "I can't stay with you. You got my secret."  
So then, the old man was teared.  
So then, it flew away up into the air. And, she gone.

[Analysis 6]

Even though the old Japanese fairy tale was a new experience for Tommy to read, he comprehended and produced the story very well. It was observed that some surface structures were retained in Tommy's memory. For example, he remembered two similar surface structures from the story such as "I'll help you out" and "He set the crane free and it flew away into the sky." He also remembered parts of the surface structures from the story such as "there was an old man who lived in the country," "After the old man got home and was telling his wife," "such a pretty girl," "not to look at me" and "every night the girl gave them the beautiful piece of cloth."

On the other hand, deep structures were retained in his memory more clearly. For example, "a beautiful girl" came from "a pretty, dainty little girl." "I'm lost. May I stay with you?" came from "I have lost my way. Please let me stay in your house tonight." "They were very glad with such a pretty girl in the house" came from "The old people were very happy to have such a pretty girl in their house." "The girl said 'I don't have any parents'" came from "she told them that she had no parents of her own." "So now on she stayed with them" came from "So the little girl stayed on with them," "Promise me not to look at me even I was working" came from "If you'll promise not to look at me even once while I work" and "the old lady got so curious" came from "The old woman became more and more curious." "I can't stay with you. You got my secret" came from "But now that you have discovered my secret, I can no longer stay with you" and "the old man was teared" came from "the old man was in tears." These surface structures are different from the story but they have the same meanings as the story. It was also observed

that Tommy produced onomatopoeia, “Tonkachi, tonkachi” as “Ton-ka-ra-ri, ton-ka-ra-ri.” His production sounded like the noise a weaving machine might make. Maybe he has some knowledge of an old style weaving machine through books, TV programs or at museums. His experience of knowing about the weaving machine may have helped him to produce the sounds as heuristic processing.

When Tommy read “he discovered a beautiful white crane caught in a snare,” he himself felt sorry for the crane and put his emotion into his production, “Oh poor thing.”

[Conclusion]

The first hypothesis that Bobby’s working memory for the prose improved a year later was supported. The second hypothesis, that in Bobby’s and Tommy’s memory, deep structures were retained more clearly than surface structures, was well supported. The third hypothesis, that Bobby would produce the prose well, even though they had listened to it a year ago, was also supported. The fourth hypothesis that both Bobby and Tommy would produce Western prose better than Japanese prose was not supported. They might have been curious about the Japanese story, therefore, they had to pay attention to listen to and read the Japanese story.

Through this project, I realized very well that deep structures tend to be retained in memory more clearly than surface structures. I also realized that knowledge from various experiences in life is very important for memory for heuristic processing.

**Reference**

- Walt Disney Production Take – A – Tape – Along Walt Disney Story Teller  
(The original story was written by A. A. Milne)  
David W. Carroll (1986) *Psychology of Language* (pp. 44, 46, 47)  
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