Research Spotlight

The “Feel the Stories” Game
Investigating the Influence of Haptic Stimulation on Story Listening

Siyan Zhao is a senior at Carnegie Mellon University, majoring in Cognitive Science and Human-Computer Interaction. Together with psychologist Dr. Bobby Klatzky and researchers at Disney Research, she is studying whether children ages four to six can relate haptic stimulation (tactile or touch) to verbal materials, and whether haptic sensations paired with verbal descriptions affect children’s responses to stories. For children ages four to six, story listening is an important method for building vocabulary, grammar rules and social knowledge. As a learning process, story listening mostly takes place with children listening to adults reading to them while, sometimes, with children looking at pictures from the book as well. Therefore, traditional story listening mainly involves 2 sensory modalities, visual and auditory. As past studies have suggested that multisensory input has an effect on learning, we want to integrate haptic input in story reading. How can the new sensory input influence children’s understanding, recall and preference of verbal materials? To understand the influence, we will read verbal materials, such as short stories, to children while they wear a vest that produces gentle and short vibrations on their back, similar to cell phone vibrations. The vibration can be felt through the clothing on their back. Children will listen to stories while feeling vibratory patterns related to the stories. For example, while listening to a story in which there is light rain, children may feel a vibratory pattern intended to resemble the feeling of rain. After feeling vibrations, children will complete simple tasks, such as naming the sensation suggested by a vibration or comparing vibrations to one another; or, after hearing a story with key words accompanied by vibrations, children may retell the story, indicate their liking for it, or answer questions about its content. Audio recordings will be made for the tasks so that researchers can transcribe them in the future. The audio will be used to assess how accurately and in what detail children remember the story.

The Chinese Words Game

Dr. Erik Thiessen and his research team are testing how easily children can learn new second language words in a game context by having children play an iPad learning game (uTalk) with Chinese words and pictures of simple colors and body parts. They hypothesize that although the task will be harder for children than adults, the children will show learning of new Chinese words. In addition, they hypothesize that older children will learn more due to increases in memory and attentional capacity. Finally, they hypothesize that the greater simplicity of the color labels (compared to more complex pictures for body parts) will lead to better learning in this limited training context. There is little exploration of the effectiveness of training techniques for adult language learners on learning in children. However, the fact that children are more successful language learners in general means that providing useful and age-appropriate language learning experiences before puberty is an important goal. Therefore, the researchers aim to modify existing training approaches for younger learners. Ideally, instructed practice like this game would be only one component of a richer, more interactive second language learning environment.
Research Spotlight, continued …

A Series of Science Content Games

The purpose of Karrie Godwin’s dissertation study is to investigate the relationship between learning and other general cognitive processes such as attention, memory, processing speed, executive function, and general reasoning ability (see the Reasoning Skills description in the October 2013). In this series of science games, she and her research team are examining how children allocate their attention in different learning environments. In particular, they are interested in examining whether children’s ability to effectively distribute their attention has consequences for learning new science content.

In the *Monkey and Ape Game*, children are presented with a series of pictures of monkeys and apes on a computer. Children are told the name for each picture. At the end of the game, a memory assessment is administered to see which items the children learned. For example, after learning the names of different types of monkeys and apes children may be asked to identify the vervet (e.g., “Point to the vervet”). It’s the one in the top right corner of the display.

In a second computer task called the *Bird Game*, children are presented with a series of pictures of birds. Children are told the name for each picture. At the end of the game, a memory assessment is administered to see which items the children learned. For example, after learning the names of different types of birds, children may be presented with a picture of a bird and asked to recall the bird’s name (e.g., “What was the name of this bird?”). The one pictured here is called a lilac-breasted roller (commonly found in the open woodlands and savannas of sub-Saharan Africa and the southern Arabian Peninsula).

Perhaps you wondered …
why children occasionally participate in the same study twice.

There are several reasons researchers might administer the same task to a child on more than one occasion. There might be technical problems with research equipment or the research session might be interrupted (for example, due to a fire drill). If this happens, you will find the exact same study description in your child’s backpack on two separate occasions. Another possibility is that the researchers are testing research stimuli or calibrating the time elements of a task, so it is helpful to compare the same child’s performance in two slightly different versions before deciding which way to run the study; that approach also reserves the largest number of children as subjects for the final version. Lastly, some studies are longitudinal, meaning that they involve monitoring children’s performance over time to measure their maturation or learning. In these cases, the multiple sessions are planned in advance and the study descriptions are labeled “Session 1 of x”, “Session 2 of x”, etc.
The Tricky Monkey Game

Alexandra Ossowski is an undergraduate student working with Dr. Marlene Behrmann (Department of Psychology) to examine the development of left hemisphere specialization for word reading ability. In adults, the left hemisphere of the brain has a much stronger ability to recognize letters and words than the right hemisphere. This ability can be observed by measuring accuracy in matching words and letters in the right visual field and in the left visual field. Normally, due to the fact that information in the right visual field has access to the left hemisphere before the right hemisphere, adults show superior accuracy for word recognition when the information is presented to the right visual field. This right visual field advantage grows over the course of development. It is often not present until the age of 6 or 7, when children solidify their letter knowledge. The researchers are interested in investigating what about the left hemisphere leads it to be strongly involved in word recognition. The hypothesis is that the left hemisphere is superior at identifying words because of its superior ability to recognize high spatial frequency information. They are interested in seeing whether children who are not yet reading show left hemisphere/right visual field superiority for high spatial frequency visual stimuli. If so, this may indicate that the left hemisphere becomes specialized for word reading due to its bias to high spatial frequency information.

• In Session 1 of 3 – **The Stripes Game**, children will play a computer game to find where a sneaky monkey is hiding. One grating (an image of varying light and dark lines) of high or low spatial frequency will be presented. The children will be told that if they want to find the monkey, they will press the green button when they see the picture with wide stripes (low spatial frequency), and the red button when they see the picture with thin stripes (high spatial frequency).

• In Session 2 of 3 – **The Letters Game**, children will play a similar game, measuring the degree of left hemisphere/right visual field superiority for letter matching. The children will be told that the way to find the monkey is to indicate whether two letters are the same or different. One letter will appear in the center of the screen and disappear. Immediately after, another letter will appear briefly at either the left or the right of the screen. The child will be instructed to press the green button if the second letter is the same as the one that was in the center, and to press the red button if the second letter is different from the first. The hypothesis is that children with greater letter knowledge (as measured in Session 3) and greater right visual field advantage for high spatial frequency information (Session 1) will be more accurate in the right visual field for matching letters.

• In the final session – **The Words Game**, the researchers assess each child’s level of reading ability and letter knowledge, as their hypothesis is that children with a higher level of letter knowledge and reading ability will also show a greater right visual field/left hemisphere advantage for high spatial frequency gratings (Session 1) and letters (Session 2). The CORE Phonics Survey will be used in this session. In this survey, children will be asked to name uppercase and lowercase letters, then tell the sound each letter makes, and finally “read” real and non-real words.

Examples of word stimuli used:

| sip  | mat  | let  | bun  | hog  | (real) |
| rut  | fit  | bat  | hot  | set  | (real) |
| nop  | sut  | dit  | pem  | fap  | (nonreal) |