Examples of Embodiment:

1. If you meet someone while you are on top of a really high, scary bridge, you will think said person is more attractive than if you were to meet that same person under less exciting conditions (Dutton & Aron 1974).

2. If someone is holding a warm cup of coffee, they will rate an imaginary person as “warmer” than when they hold a cold cup of coffee (William & Bargh 2008).

3. Holding a heavy clipboard will cause one to value foreign currency at higher levels than one who is holding a lighter clipboard; the heavy clipboard will also cause participants to think more deeply about abstract issues (Jostman, Lakens, & Schubert 2009).

All of these findings can be explained by the theory of embodiment. This is the idea that when you absorb information from your surroundings, your surroundings influence your cognitive functions without your awareness (i.e., if you are holding something warm when you are thinking about another person, you will rate that person as “warmer”). The lab I worked with in the summer of 2011 was researching embodied cognition with children.

Tool study background: There is a “teleo-functional” theory about tool use that argues that tool use comprises a category of action that is distinct and privileged (Casler and Kelmen, 2007). Part of the current study is teaching kids to use tools for arbitrary actions to see if they learn those actions as well as they do task-oriented tool use.

Another aspect of this study is to see whether manufactured tools are more memorable/easier to learn to use than natural tools (like a stick) or if they are both equivalent.

Stroop Study background: I’m sure you have done this before. Try to say the COLOR of these words (not the word that is written):

Blue  Green  Purple  Red  Yellow

That is hard! You have to suppress the word you are reading to be able to say the color of it. Also, it is difficult to test this effect in young children, since they cannot read yet. The task can be modified for children by presenting children with a picture and asking them to pick the “opposite.” For example, if they were shown a hammer and a screwdriver, when the screwdriver was presented, they would have to say “hammer.”

In a previous study using a modified Stroop test, it was found that children between the ages of three and five showed differences between how well they inhibited labels and actions. They did a better job on the task when the Stroop test involved actions than when it involved labels (Hahn and Gershkoff-Stowe, 2009). The purpose of the current study is to further explore this relationship and collect data on response time (in addition to accuracy). The findings of the 2009 study were surprising because one would expect the participants to perform worse when watching an action than when just hearing the label (because the action should be more embodied).

What were the questions?

Tool Study: Do young children learn how to use tools better if the tools are introduced with a concrete task to accomplish? Do children learn to use manufactured tools better than natural tools (if they are both equally functional)?

Stroop Study: Did children in the previous study respond more accurately in the action condition than the label condition because they spent significantly more time answering in that condition?

Hypothesis

Tool study: If children perform equally well in the functional and arbitrary conditions (and with natural and manufactured tools), it implies that tool use does not constitute a privileged category of action.

Stroop study: If there is a stronger delay in the action condition response time, that supports an embodied theory of cognition. Also this would explain the results of the previous study, because there may have been a longer delay (along with the higher accuracy) in the action condition than in the label condition.

Who are the participants?

Tool Study: 2 and 4 year olds.
Stroop Study: 3, 4, and 5 year olds.

What was the procedure?

Natural and Manufactured Tools for Tool Study

The natural tools were bamboo, a “y” stick, a bone, and a parsnip. The manufactured tools were a modified tongue scraper, a rubber ball on a stick, a putty knife, and a zester.

Apparatus for Tool Study

From left to right: use the tool to poke the foam ball out of tube, use tool to turn on lights inside box (by pressing), bang on gourds to make sounds and (back) knock item off of ledger.

Children were trained to use specific tools with either an apparatus or to do random actions with the tools (for example: place the parsnip on their head). They were randomly assigned to get the functional or arbitrary groups; also tool and training presentation order were randomized.

After training, the children were shown either the apparatus or the action and asked to select the correct tool.

Stroop Study

A program was created specifically for this study for the Ipad. The program shows a researcher saying a word (like “book”) or acting out a word (the gesture for book would be two hands opening like a book). The children were instructed to touch the “opposite” picture of whatever the researcher says or acts out. For example, if she acts out “book,” the child should point to the picture of pen and vice versa.

Each child was shown either the “action” condition (where they watched a video of the action) or the “label” condition (where they watched a video of the researcher saying the word).

The Ipad collected precise response time data for each trial.

What are the independent variables?

Tool Study:
1. Manufactured or natural tool (A child would be trained either with, for example, the “y” stick or the putty knife.)
2. Using the given tool for an arbitrary action or to accomplish a task (Each child is assigned before coming in to be trained with either the arbitrary actions or the apparatus.)

Stroop Study:
1. Video of action or video of the researcher saying the word.

What are the dependent variables?

Tool Study: 1. Number of correct tools selected
Stroop Study: 1. Response Time 2. Accuracy

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References

Hahn, E.R., Gershkoff-Stowe, L. The uncoupling of Embodied knowledge: Comparing words and actions in a Stroop interference task. 2009