Winter/ Spring
2004

# The Laboratory for Developmental Studies at Harvard University

Greetings from LDS! Recently, your baby participated in one of our studies. We appreciate your interest and support, and want to share with you what we've found! We have included in this newsletter summaries of the baby studies that we've run over the last few months. Some are new, some you might recognize from our last newsletter. Many are still in progress, but some are finally finished! None of them, however, could be possible without your help. Therefore, this newsletter is first and foremost our way of saying THANK YOU.

If you have any questions about these studies or the lab in general, please feel free to call us at (617) 384-7930 or (617) 384-7777. We also have a webpage for the lab where you can find out more about us and our studies (and also view copies of past newsletters):

www.wjh.harvard.edu/~lds

We hope to have you come visit for more studies soon!

## *Thank You!*

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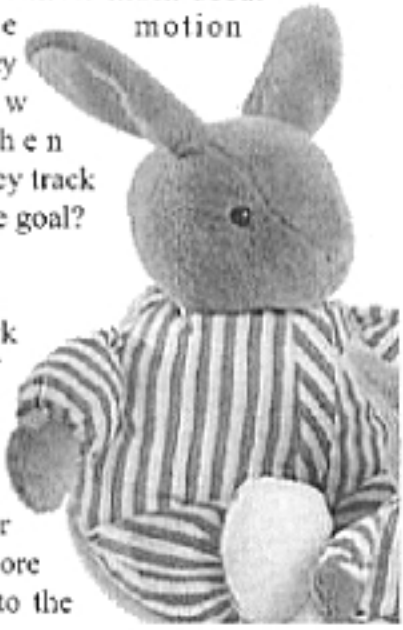
# Actions vs. Goals

*Laura Wagner, Visiting Research Fellow*

This study is looking at what kinds of information babies can keep track of in a motion event. When your baby watches you move around the house, is he or she thinking, "Mom's going into the kitchen" (the goal of your motion) or instead thinking "Mom's walking" (the way you were moving)? We're interested in whether babies can keep track of both of these kinds of information and if they have a preference for tracking one over the other.

In the study, we showed the babies a little play in which a bunny moved to one of two goal locations (either a yellow tub or a purple platform). For some babies, the bunny hopped and for others, he slid to the goal. We showed this play to the babies many times, until they became accustomed to it. Then, we switched the location of the two objects. During the test phase, the bunny either moved to the same object (though it was now in a new location), or to the other object (which was now in the old location). We timed how long the babies looked at each event. If the baby was tracking the goal of the bunny's motion, he or she should consider the motion to the new object as novel, and therefore look at this option for a longer time than when the bunny was at the same old object.

So far, our results show that 9-month-old babies do not track the goal of the bunny's motion, but 11-month old babies do. We're still doing a lot of work with this study, and over the next semester, we hope to find out more about 11-month-old's abilities in this area: Can they track the goal in the presence of different manners of motion? Do they remember much about the motion they saw when they track the goal? Do they prefer to track goal or manner of motion information? We hope to be showing off our bunny to many more babies coming into the lab.



# Flashing Dots

*Justin Wood, Graduate Student*

In a set of studies, we investigated the speed at which infants process numerical information, and also how they construct numerical representations. There are two possibilities regarding the second question. First, infants might enumerate individuals one after the other. Second, infants might enumerate all of the individuals at one time. We found that infants successfully discriminate 4 vs. 8 dots when a new array appears every 2 seconds, but fail when those arrays appear every 1 or 1.5 seconds. They still succeeded with a 2 second refresh rate in an 8 vs. 16 comparison, however, suggesting that infants enumerate all of the individuals at one time. We also found that infants become faster in processing numerical information from 9 to 11 months, rather than earlier in development. This is interesting, because it suggests that the precision of representation, and the speed at which those representations are created, follow different developmental trajectories.

# Secret Agent Study

*Rebecca Saxe, Post-Doctoral Fellow*

Children seem to know a wide variety of things about how people are different from other material objects by a very young age. For instance, even 6-month-olds know people make goal-directed actions, while inanimate objects do not. By the same age, infants are also beginning to recognize and understand causal interactions. The Secret Agent Study was designed to test whether (and when) infants could combine these two kinds of knowledge – about causality, and about the difference between people and other objects. We asked whether preverbal infants already know that it typically takes a person to move an inanimate objects. If babies do know that it takes a person to move an object, then will they expect to find a person at the source of an object's motion?

Recently Finished!

We ran several versions of the Secret Agent study all based on the same idea. First, we tossed a bean bag over a wall and out onto the stage from an hidden starting point. Once the kids were used to seeing the same pattern over and over, we let infants see into the hidden starting points. On some trials (SAME side trials), infants saw that there was a human hand in the same place from which the bean-bag was thrown. On the other trials (DIFFERENT side trials), there was no hand where the bean-bag came from, but there was a hand on the opposite side of the stage.

We predicted that infants who knew that *somebody* must be throwing that bean-bag would expect to see a hand in the SAME position, and would be surprised to see the hand in the DIFFERENT position. To measure this surprise, we compared how long the children looked at the hand in the SAME and DIFFERENT positions. Since infants generally look longer at something that surprises them, we expected infants to look longer at the hand in the DIFFERENT position.

This is exactly what we found! After testing many, many 7-, 10-, and 12-month-olds, we have found that infants in all of these age groups do seem to know that objects are usually moved by people. And, based on this knowledge, they do expect a person (or at least a hand) where they have seen an inanimate object move. We are very excited about these answers to our original questions, and the Secret Agent Study has inspired a lot of new ideas for great follow-up studies!

# Jumping Puppets

*Justin Wood, Graduate Student*

Long before children learn verbal counting and symbolic arithmetic, very young infants (as young as 5 months!) have a remarkably sophisticated system for reasoning about number. In the Jumping Puppets Studies, we asked whether infants enumerate different types of individuals in the world. Specifically, we looked at whether infants represent the number of actions in a sequence (puppet jumps). Interestingly, at 6 months, infants noticed a difference in the number of puppet jumps when the difference was large (4 vs. 8 jumps), but failed when the difference was smaller (4 vs. 6 jumps). At 9 months, however, infants succeeded with the 4 vs. 6 comparison, suggesting that infants become more precise in representing numbers with age. Further studies found that infants fail to discriminate small numbers altogether. This pattern of successes (and failures) is very similar to the levels of performance found in past studies with sounds and dots, suggesting that infants have a single, abstract system for representing number.