THE UNIVERSITY OF QUEENSLAND
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Early Cognitive Development Centre
School of Psychology

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As 2011 draws to a close, all of us at the ECDC would like to sincerely thank you for participating in our studies. You have not only increased our knowledge about children's development, but also assisted our students in obtaining their degrees at both the postgraduate and undergraduate levels. We hope you enjoy reading about our recent research results for 2011 in this edition of our Newsletter.

Over the last six months the Centre's reception room area has been transformed, and features a fresh new welcoming look. We also have an exciting range of innovative toys to entertain your children when you next visit us in 2012.

In this Issue: *page*

What Children Believe	1
Memory and Planning	2
Children's Awareness	2
Parental Imitation	3
Social Behaviour	3
Learning by Imitation	4-5
Media Toy Choices	5
Infants and Counting	6
Baby Imitation Update	6

"We need to identify what determines when children will and won't believe the things adults tell them"

Recent Research Results

"Do what she says? Or do what I know?"

Young children believe. They believe adults when we tell them what new objects are called, that butterflies were once caterpillars, and that the earth is round. They even believe us when we tell them that the reindeer that pull Santa's sleigh can fly.

In fact, it is important that children believe what adults say as this is how they learn – they need to believe in order to build up a vocabulary, to learn about animals and people and how things around them work.

However, do children continue to believe adults even when the information that is given to them contradicts what they should already know? Do they express some scepticism?

Evidence suggests that by age 4, children understand that a key is needed to unlock a padlock, and that water, when poured, can only fall directly downwards (into a cup that is directly beneath it, and not into a cup that is away from the flow of water).

Children in separate conditions were told that either a key (plausible information) or a stick (implausible information) had been used to unlock a padlocked box.

Children were also told that water poured from a beaker into a line of concealed cups had either fallen into a cup directly beneath the flow of water (plausible information) or into a cup that was far away from the flow of water (implausible information).

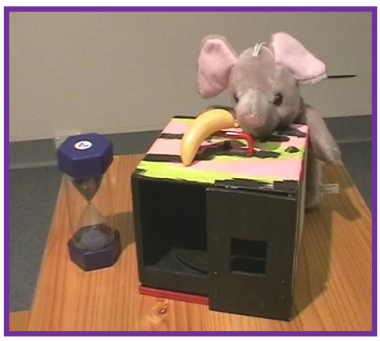
Children who were given plausible information were likely to act in keeping with what the adult suggested when asked to open the box and find the water.

Children who received implausible information showed some inclination to accept the adult's testimony, with some children choosing the stick to open the box and others searching for the water in a cup that had not been beneath the beaker when water was poured.

This suggests that while young children do not blindly believe everything adults tell them, there is some inclination to accept what they are told, even if it seems to contradict their expectations.

We are currently exploring this further to try to identify what determines when children will and won't believe the things adults tell them.

Memory and Planning for the Future in 4- and 5-year-olds



"Language ability may be importantly related to memory and planning for the future."

Young children often need their parents' help to remember past events and plan for future events. For example, they might struggle to recall details of a trip to the beach or remember to bring their lunch to kindy.

This study was designed to uncover when children develop memory and planning for the future, and whether these abilities are related to each other. 4- and 5-year-olds were given a number of tasks, including (1) a task that required them to remember stories 15 minutes after hearing them, (2) a task that required them to select an appropriate tool to be used 5 minutes in the future, (3) a task that required them to repeat numbers said by the experimenter, and (4) a vocabulary test where they had to match words with pictures.

We are still reviewing the results, but they suggest a number of interesting things.

First of all, nearly every child received an above average score for their age on the vocabulary test, suggesting they were a very smart bunch!

As expected, the 5-year-olds performed better than the 4-year-olds on the story memory task, the number memory task, and the vocabulary task, suggesting that these abilities develop throughout the pre-school years.

However, there was only a small difference between the two age groups in the future task, suggesting that young children still have a way to go before they master planning for the future. Unfortunately parents, you may be packing lunches for some time yet!

Finally, the children who did better on the memory tasks tended to also do better on the future task, suggesting that these abilities may be related. Similarly, the children who did better on the vocabulary test did better on the memory and future tasks, suggesting that language ability may be importantly related to memory and planning for the future.

We will be conducting similar tests over the next couple of years to help better understand these relationships between different abilities.

Children's Minds know what the Eyes Cannot See

"Children as young as 3.5 years old are aware of what they know, and can use that knowledge to perform better on a searching task."

As adults, we often ask ourselves what we know about a situation before deciding how best to act on it. Evaluating our own knowledge is a very important skill; however, it is unknown when this skill develops in children.

We tested whether 3.5 and 5.5 year-old children "know what they know" in the context of a hiding game. Children saw two jewelled tokens being hidden within one of four cups, and were asked to find them. Sometimes, they saw which cup they were put in, but other times they could not see because a barrier covered the four cups. In addition, sometimes the children saw one jewel being put into an extra container. It was predicted that if both 3.5 and 5.5 year-old children know what they know, then, when they had seen exactly where they were hidden, they should search correctly underneath the cup containing two jewels.

However, when they did not know where the two jewels had been hidden, they should opt for picking the container with one jewel, as this was a smarter strategy than guessing where the larger reward was. It was found that both 3.5 and 5.5 year-old children chose the container known to hold one jewel over guessing where the two jewels had been hidden when they did not know their location.

This demonstrates that children as young as 3.5 years old are aware of what they know, and can use that knowledge to perform better on a searching task.

Parental Imitation of Babies in different Cultures

Parents and infants communicate with each other in various ways.

One unique element of parent-infant interaction is that parents copy their babies' sounds and gestures. We know that Australian parents imitate their babies frequently: approximately once every two minutes during free play.

A recent study investigated whether or not parental imitation is a universal aspect of parent-infant interaction. To address this question, I compared Iranian and Australian mothers on the number of times they imitated their infants during a 10-minute free play.

What we discovered is that parental imitation is equally frequent in both of these cultures. At the same time, a cultural difference is evident in that Australian mothers imitate their infants' vocal sounds more than Iranian mothers, and Iranian mothers imitate their infants' facial and gestural actions more than Australian mothers.

We speculate that this reflects cultural differences in parents' expectations for their children, even at this early age. Further studies are planned to test this idea.

"Parental imitation of babies is equally frequent in both Iranian and Australian cultures"

Are Notions of Right and Wrong Acquired Socially?

How do we come to understand which behaviours are *right* and which others are *wrong*? Psychologists have determined that when we see a behaviour that is immoral we have a strong negative emotional (and neurological) reaction that is very similar to when we see or smell something disgusting, such as rotting food. The opposite is also true—positive emotional responses lead us to feel that certain behaviours are moral and permissible.

This has led to arguments that our evaluations of *right* and *wrong* may be biologically innate. Coded in our genes, as the result of a long process of evolution by natural selection. However, this doesn't seem able to explain things like the difference in values from 50 years ago to now, or the diversity of values between cultures. What is considered *right* or *wrong* might therefore also be the result of social norms.

It is becoming increasingly apparent that what makes humans unique is our ability to learn from others. No other animal is as social as we are and this is especially true of children. Therefore, we conducted an experiment to examine if children socially learn to have emotional responses towards certain behaviours, simply by observing the emotional reactions of members of their group. This was done by pairing the emotional response of a group of adults (on a video) towards an arbitrary, novel, behaviour (e.g., opening a strange box) shown by another adult.

We expected that children's own emotional responses, and the actions they favoured when given the box themselves, would mimic that of the adults. They would have a negative reaction, when they saw a negative group response or a positive reaction, to a positive group response.

This is not what we found. Instead it was discovered that children had a strong tendency to copy the behaviours they saw the group of adults do, regardless of emotional reactions and even when the adult who was not part of the group used actions that were easier and quicker. This strong tendency to copy adults is consistent with previous research.

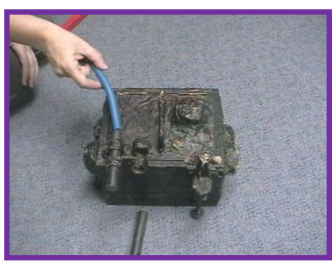
Follow up experiments are being planned to build on this work, and we are hopeful they will shed more light on how judgements about right and wrong get formed.

"Children tend to copy behaviours of a group of adults rather than an adult who is not part of that group."

Learning by Watching What Others Do

"Children appear to be such willing copycats because they assume the adult wants THEM to do the same."

"Learning through observation didn't compromise task efficiency."



For a number of years we have been exploring how children learn from others and what they pay attention to when an adult shows them how to do something. As part of this, we are among the first of a small group of international researchers to have shown that young children will copy obviously useless actions used by an adult when achieving a specific outcome, even if such actions get in the way of success (e.g., because they are distracting or difficult to perform).

During the last year we have been running a series of related experiments that have been designed to investigate this phenomenon further.

In previous studies of this nature an adult directly modelled actions to children. Perhaps children appear to be such willing copycats because they assume the adult wants THEM to do the same. Well what if the actions are not shown directly to them but to someone else instead? And what if the person who gives them the apparatus appears naïve as to their use?

To examine this we had children watch one adult show another how to use a miscellaneous object (e.g., a blue stick) to open a series of unique boxes using both useful (e.g., using the stick to press a switch that allowed the box to open) and irrelevant actions (e.g., wiping the stick across the top of the box), and then varied who gave the objects to the children – the demonstrating, and assumedly expert, adult or by the observing, and assumedly naïve, adult.

In a second experiment we replicated this design but allowed children to play with some fun toys while one adult was demonstrating actions to the other. We assumed the children would be distracted and hence be less inclined to copy everything.

In fact what we found was that across both experiments children still showed a strong tendency to copy all of the modelling adult's actions in getting the boxes open.

In a second set of experiments we have been looking at whether children, when shown an adult using irrelevant actions to open a box, will transfer those actions to a second similar, but not identical, box. This is important as it tells us the extent to which children anchor specific actions to specific objects.

We have also been looking at whether or not this type of learning is more efficient than children learning on their own through trial-and-error learning. First, we found that children did not transfer irrelevant actions from one object to another, although they did use the demonstration to learn what to do (i.e. how a box could be opened having seen a demonstration on a similar but different box).

Secondly, when given a similar box to open children took about the same time whether children learned on their own or watched an adult show them what to do. In other words, learning through observation didn't compromise task efficiency.

Finally, these experiments and similar ones being conducted in other labs overseas have one thing in common – the apparatus used all involve actions that typically involve something hidden (e.g., a hidden switch). Perhaps children copy useless actions because they don't fully grasp how each of the demonstrated actions might be related to the final outcome.

To investigate this we presented children with a task in which they had to get a toy out of a clear Perspex tube – but the only way to do so was by pouring water into the tube (i.e., to float the toy to the top).

Almost all of the children we tested did not discover the solution on their own. So after being given a chance to work out what to do, some children saw the experimenter pour directly from a water bottle into the tube.

Learning by Watching What Others Do……*continued*

Others saw her pour from the bottle into a medium sized cup before pouring the water from the cup into the tube. (Using the cup is irrelevant to the outcome as it doesn't actually achieve anything and because the cup isn't big enough to hold enough water to fill the tube. This sequence has to be repeated several times – hence it takes longer than just using the bottle directly).

Others saw her pour water into a small cup first (which takes even longer than using the medium sized cup).

We found yet again, that children copied whatever the experimenter did – even repeatedly pouring from the bottle into the small cup.

We've since been exploring this further with a task requiring children to make tools using pipe cleaners – but we haven't yet finished this so you'll have to wait for our next newsletter to hear about what we've found.

All in all, the results of these studies emphasize human children's readiness to acquire behaviour that is in keeping with what others do, regardless of the apparent efficiency of the actions employed.

In so doing they not only acquire new skills, but become active participants in cultural learning.

"Children will copy obviously useless actions used by an adult when achieving a specific outcome."

Media Toy Choices

Children are being increasingly exposed to TV programs that are heavily linked to toys and other merchandise (Ben10 is a stand-out example).

This has raised questions over the value of such programs and whether or not they should be treated as program-length commercials.

In fact some of these programs are now airing alongside advertisements for related products.

Does this linking of TV show, advertising and product have any impact on children's toy choices?

To investigate this we had preschoolers watch videos including edited clips of TV shows (some product-related, some not) and advertisements for toys (some associated with the shows, some not).

They were then invited to a pretend 'toy store' where they could indicate which of a selection of toys they'd most like to buy (some of which were related to the TV show and/or the advertisements they had just seen), after which they were given time to freely play with a kit of toys (some of which were related to the TV show and/or the advertisements they had just seen).

We found that children who had seen a clip that paired a TV show with an ad for toys related to that show were more inclined to play with that toy, and to play with it for longer, than children who either saw the show but not the ad or the ad without the show.

This indicates that there is a cumulative effect of linking shows, ads and toys on children's play behaviour.

Whether this effect is positive or negative we don't yet know, something we hope ongoing research will clarify.

"Research indicates that there is a cumulative effect of linking shows, ads and toys on children's play behaviour."

Infants' Understanding of Counting

"18-month-olds have learned that all objects in a set must be counted but do not yet recognise that counting words must be recited in order"

Counting is an essential numerical skill upon which more advanced mathematical knowledge is built.

Children begin to count some time after age 2 and their skill develops over the next several years.

But before then, most infants witness many instances of counting performed by parents and older siblings, or portrayed on television.

Do they learn from watching others count?

A previous study from our lab suggests that they do. We found that 18-month-olds significantly preferred to watch video sequences portraying accurate counting, in which all six objects in a set were counted, as opposed to inaccurate counting, in which only two of the six objects were counted over and over again. Infants' preferences in this study indicated that they recognised—and lost interest in—counting that was not done properly.

This year we began a new extension of that study.

Now that we know infants take notice when not all of the objects in a set are counted, we decided to investigate whether or not they would notice another type of counting error.

In this case, infants again watched videos of correct and incorrect counting. This time, for the incorrect counting sequences, all of the objects were counted but the sequence of count words was jumbled. So on one trial, infants heard "one-four-five-six-three-two" and on another they heard "three-six-five-two-one-four."

We tested 18-month-olds using this procedure and found that they failed to show any preference for correct or incorrect counting.

We need to do more research with older infants now, but at this early stage, it appears that by 18 months of age, infants have learned that all objects in a set must be counted, but as yet they haven't learned that the count words have to be recited in a fixed order.

Baby Imitation Update

"Do infants imitate actions when playing with toys"?

Our Longitudinal Neonatal Imitation project is still under way with Siobhan busy recruiting new babies.

Janine is currently in Seattle, talking with other imitation experts and presenting some preliminary findings at the Institute for Learning and Brain Sciences, University of Washington.

We would like to extend a big thank you to all the families who have participated so far, this project would not be possible without you, and your help is immensely appreciated. Almost 60 babies have either completed or are still participating in our study and we are looking to recruit another 30.

Next year, we will start to focus on data analysis and reporting results; we look forward to sharing our findings with you in 2012 and beyond.

We currently have studies in progress involving children aged from newborn to 5 years. If your child/ren falls into any of these ages, we would love to have you participate in our studies again.

If you have friends with children aged from newborn to 5 years who might like to get involved, we would appreciate it if you would refer us to them.

For more information, please call us on (07) 3365 6323. You can also register your interest on our website below: