Early Cognitive Development Centre

Research Results

The entire ECDC team would sincerely like to thank you for participating in our studies during 2021. It has been a challenging year for all and we greatly appreciate how you have helped increase our knowledge about children's development, and also assisted our students in obtaining their degrees at both postgraduate and undergraduate levels. We hope you will enjoy reading the recent results of our research.

To find out more about us, visit our website ecdc.psychology.uq.edu.au

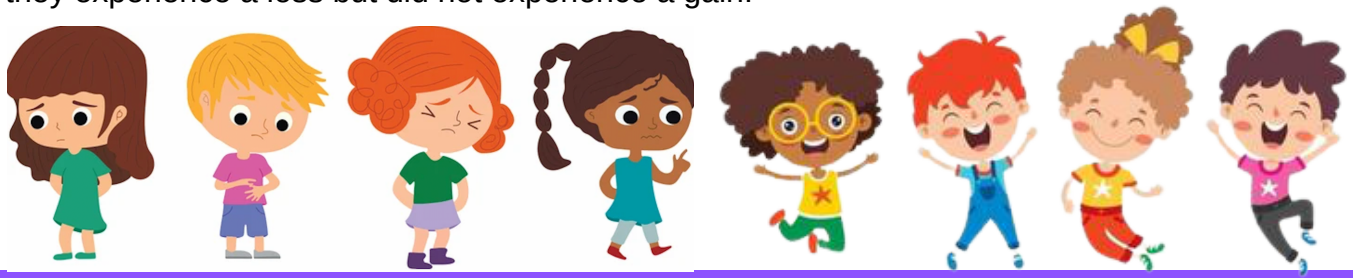
How do 4-9-year-olds experience regret and relief?

Every day we make decisions and sometimes we imagine an alternative where we could have made a better or worse choice. This can lead us to experience the emotions of regret and relief.

In this study, children were presented with two boxes and two keys that would open the boxes. Children were given five stickers at the start of the task. If they opened a box that was red on the inside they would lose 4 of their stickers and if they opened a box that was green on the inside they would win 4 more stickers.

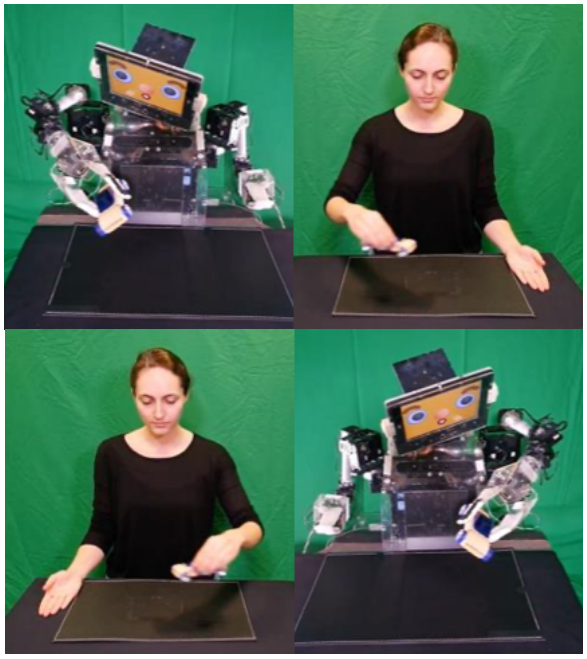
We asked children how they felt about the box they chose. We would then show children what was inside the other box, which could have contained either the better or worse outcome. The children were then asked again how they felt about the box they had chosen – did it make them feel happier (relief), sadder (regret), or the same?

We found that children aged 4 to 9 years experienced relief and regret in this task. This suggests that children (aged 4 to 9) may experience relief when they experience a gain but avoided a loss and regret when they experience a loss but did not experience a gain.



What do 6-9-year-olds think about the actions of robots?

With advancements in robots for use in a wide variety of situations, research into how children see them is important for their implementation in schools and other child-based settings.



Little research compares human and robot actions directly, especially when the actions are ambiguous, unclear or accidental. Some research has shown that when robots do something explicitly mean, children say they are more wrong than a child performing the same actions. However, it is unknown how children will judge robot intentions, morality, and punishment when the action is ambiguous and no context is given. Therefore, we were particularly interested in how children judge the intentions and morality of the robot and the amount of punishment they think is necessary.

We found that children aged 6-9-years think that compared to a robot, the human was acting more on purpose than by accident, and they were more likely to punish a human than a robot. These findings were interesting as the children did not think the human was more morally bad than the robot. This may suggest that children understand that robots aren't responsible for their actions as they are programmed by another person.

Help us investigate how siblings learn from each other!

A big thank you to all families who have participated in the Siblings Study so far! We greatly appreciate your time and look forward to seeing you all in the labs for your follow up sessions next year.

We aim to understand how children help their siblings to learn. We are exploring the role of siblings in typically developing sibling pairs, and sibling pairs where one child has a diagnosis of ASD (autism spectrum disorder).

Participation Criteria:

1 sibling aged 2 ½ - 5 years old who is developing without problems AND 1 sibling who is between 2 ½ - 8 years old and is also developing without problems.

OR

1 sibling aged 2 ½ - 5 years old *with* clinically diagnosed ASD AND 1 sibling aged 2 ½ - 8 years old developing *without* ASD.

Siblings will be asked to complete two visits to the ECDC and one home visit over the course of a year, where they will complete fun play and learning activities.

I*f you are interested in participating in the Siblings Study or have any questions, contact Kendall at k.wall@uqconnect.edu.au*

Participate Now! W: ecdc.psychology.uq.edu.au E: ecdc@psy.uq.edu.au

Deaf/hard of hearing childrens' development of social understanding

Past studies have shown that DHH children in hearing families experience delays in their development of social understanding. The current evidence suggests this is due to reduced access to language, limiting the amount of talk about the mind (thoughts, beliefs etc.) to which the children are exposed. In contrast, hearing children who speak two languages tend to have advanced development of social understanding. One proposed explanation for this is that bilingualism improves cognitive skills, which in turn assists the development of social understanding.

Many DHH children are bilingual in a spoken and signed language. This is referred to as bimodal bilingualism. Little is known about how bimodal bilingualism these skills. Additionally, past research has not captured all the variation in exposure to signed communication in DHH children. This study aimed to address these gaps by assessing the relationships between the amount of exposure to signed communication and social understanding and mental switching ability in DHH children who use spoken English.

Overall, the children in our study performed well on social understanding, mental switching, and English vocabulary tasks. We did not find a relationship between exposure to signed communication and social understanding or mental switching ability, but these results are inconclusive due to elements such as the small sample size, and further research is necessary. However, our study provides useful information and a good basis for future research to continue the exploration of this topic. It shows that past literature needs to be updated, as the DHH population has changed over time (for example, more DHH children in hearing families are exposed to signed communication at a young age), there appear to be fewer delays, and there is a key variation that past literature has missed.

Our study shows there is a wide range in the amount of exposure to signed communication and exposure can vary over time. Our study was also the first to include DHH children with additional disabilities (25% had clinical diagnoses of autism and/or ADHD, which can also affect social and cognitive development).

We currently have studies in progress involving children aged from newborn to 12 years. If your child or children fall into any of these ages, we would love to have you participate in our studies again. If you have friends with children who might like to get involved, we would be delighted for them to become involved in our research.

To contact us, please email ecdc@psy.uq.edu.au or register your interest *here.*

Early Cognitive Development Centre

Can 4-7-year-olds children pick a helper?

Humans often turn to other humans for help when faced with challenging, confusing or new tasks. For instance, you might ask a passenger in your car for navigation directions or call your grandma for a recipe you can't quite remember. Like adults, children also engage in help-seeking behaviour.

This study investigated how children select helpers when faced with a difficult memory task. Children played a game where they had to search for stickers hidden under several paper cups. After one round of the game, children watched two animal characters (a cockatoo and an elephant) compete in two games. One animal won a memory card game, and the other animal won a ball game. Children then played the hidden sticker again but this time were given the opportunity to choose an animal character to assist them.

This study found that from four years old, children were more likely to ask for help when the memory game was more challenging. Further, children were more likely to choose the character with a strong memory as a helper. These findings show that children don't ask for help at random, opting to do so when the task is more challenging compared to when it is easy. These findings also indicate that children (like adults) can identify helpers that will be more useful to them based on the task at hand.

Children's screentime during COVID-19

In the midst of the 2020 COVID-19 lockdown, parents/caregivers with children between the ages of 3 and 8 years, completed an online questionnaire about child development in the context of the pandemic. In addition to respondents from Australia, data were also collected from parents in China, Italy, Sweden, the United Kingdom, and the USA.

The first results from this large-scale international study focus on the responses regarding children's electronic screen-based media use. Results revealed an overall increase, of nearly an hour per day, in screen time as a result of the COVID-19 pandemic. This increase was driven largely by entertainment uses, but there was also a smaller increase in education app uses. The patterns were similar across all countries, except for China where screen time was already high prior to the pandemic.

Participate Now! **W:** ecdc.psychology.uq.edu.au **E:** ecdc@psy.uq.edu.au

Don't let me forget... How do 3-8-year-olds use reminders?

Humans often behave in ways that simplify difficult tasks. For example, we write shopping lists and use calendars rather than relying on our memory, reach for calculators when solving mathematical problems, and turn to GPS systems to find our way home. These are some examples of the many ways that humans use and modify their external world to increase the efficiency of their thinking and problem-solving. However, despite being an important part of everyday human behaviour, little is known about the development of this ability.

The study explored when and how 3- to 8-year-old children spontaneously began outsourcing their thinking without being instructed to do so. In this task, we placed a sticker into one of three identical containers, and then hid the containers from the child and shuffled them into a new order. This means that children had no way of knowing where to search for the sticker, and instead had to guess the answer. To avoid having to guess the answer, children needed to set reminders about the location of the hidden sticker by marking the container holding the sticker before the containers were shuffled (see below).

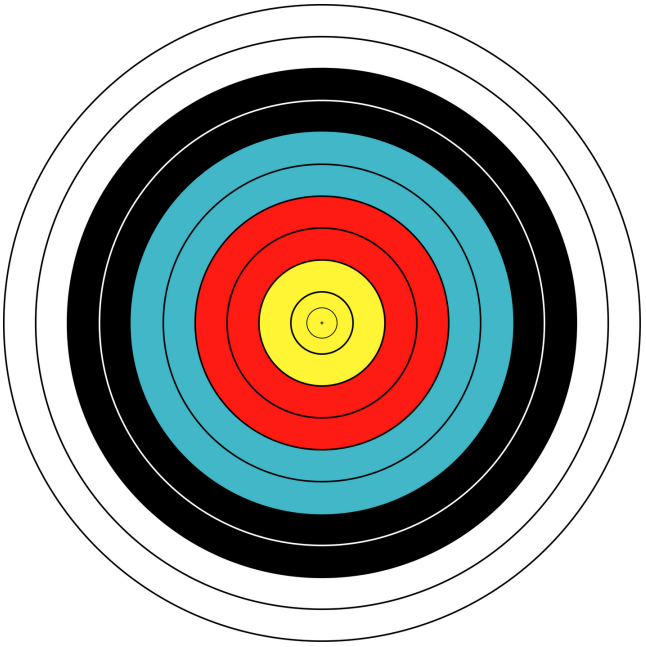
We demonstrated this marking behaviour to children, and then gave them the marker and told them that they could “do whatever they wanted”. Although older children were more likely to copy the demonstrated marking behaviour than younger children, all ages demonstrated some evidence of spontaneous reminder setting.

But does this really show evidence of spontaneous reminder setting, or were children just copying the marking behaviour that they saw demonstrated, without understanding how it helps them solve the problem? To answer this, we included a final task to see whether children understood the logic behind using markers to distinguish the rewarded container from the unrewarded containers. Here, we marked all three containers and was interested to see whether children spontaneously removed the marker from the container holding the sticker (see below). Unlike the first marking behaviour, this one was not demonstrated to children.

In this task, with increasing age, children were more likely to spontaneously move the markers in a way that correctly distinguishes the target container and were also more likely to come up with a variety of different and effective strategies to achieve this. Overall, our results, therefore, show that, in situations where they cannot rely on their own memory abilities to solve a problem, children are more likely to spontaneously set external reminders with increasing age and become more flexible and innovative in their approaches to externalised problem-solving.

Do 4-7-year-olds think about their future emotions?

Adults and children have a tendency to overpredict our emotions when imagining how we would feel in response to a future event. It is not yet clear why we continue to make these mispredictions over time. One study found that children who overpredicted their emotion to a greater degree were more likely to engage in future-directed practice. Our study aimed to follow up on this finding.



Children aged 4- to 7-years-old first predicted how they would feel to win or lose an iPad game competition. They were then given two minutes of free time with the relevant game and an alternative iPad game. During this time, children's engagement in practice was observed. After playing the competition, which was set to a forced loss, participants would rate how they felt to lose. We found that those who overpredicted their sadness when thinking about losing the competition, engaged in more practice on the relevant task.

Our findings are one of the first to indicate this tendency to overpredict our future emotions may be functional. So, perhaps we continue to make these mispredictions time after time because it helps motivate us to engage in future-based action in the present.

How do 3-5-year-olds use private speech?

In this study, we recorded the private speech (i.e., speech to self) of seventy-one 3- to 5-year old children while they completed a Duplo construction and an iPad administered card sort task.

We coded the form (i.e., how out-loud or internalised) and content of private speech utterances during independent task completion.

Children who demonstrated more internalised markers of private speech (i.e., mutters, whispers, silent lip movements) scored higher on both tasks.

Children using more frequent task-irrelevant utterances were less accurate in their Duplo construction.

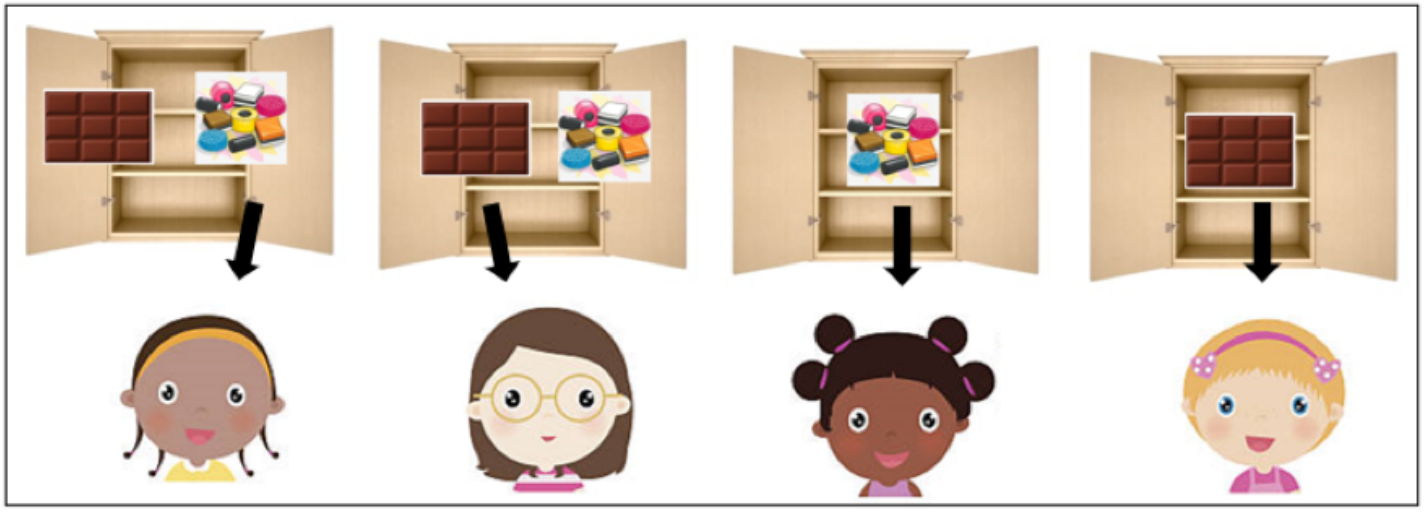
Children using more frequent forethought utterances (i.e., planning, analytical or self-motivational statements) were more accurate in their Duplo construction.

Participate Now! **W:** ecdc.psychology.uq.edu.au **E:** ecdc@psy.uq.edu.au

From age 6 do children make moral judgements based on the past?

When making a moral judgement of someone's behaviour, we often consider what they should have done differently. For example, in a car accident, we might reflect that the perpetrator of the accident shouldn't have run a red light. However, this judgment typically changes if we find out that a perpetrator of a crime did not have a choice. For example, we'd probably be a bit more lenient if we found out the driver who ran a red light had a debilitating foot cramp, causing them to be unable to stop at the light. Do young children reflect on these sorts of past choices?

We investigated this by asking children to make judgements of four characters who needed to bring a snack to share at a birthday party. Two of the characters had a choice, they could choose to be nice and bring the snack the birthday girl liked (i.e., liquorice) or they could choose to be mean and bring the snack the birthday girl disliked (i.e., chocolate). The remaining two characters had no choice because they only had liquorice OR chocolate available. Therefore, they had to simply bring what they could. You can see what each friend brought in the accompanying picture!



From the age of 6, children identified that the character who had the choice to do the nice thing (i.e., bring the liquorice) but instead chose to bring the chocolate, was meaner than the friend who had no choice but to bring chocolate. Likewise, from the age of 6 they also identified that the character who chose to do the nice thing and bring the liquorice was nicer than the friend who had no choice but to bring the liquorice. 4 and 5-year-olds, however, did not take into account what the characters could have chosen to do. Instead, they simply reported that 'bringing the liquorice was nice, and bringing the chocolate was mean'. Overall, this suggests that from the age of 6 children make moral judgements based not only on present outcomes but also on past choices.

We currently have studies in progress involving children aged from newborn to 12 years. If your child or children fall into any of these ages, we would love to have you participate in our studies again. If you have friends with children who might like to get involved, we would be delighted for them to become involved in our research. To contact us, please email ecdc@psy.uq.edu.au or register your interest *here.*

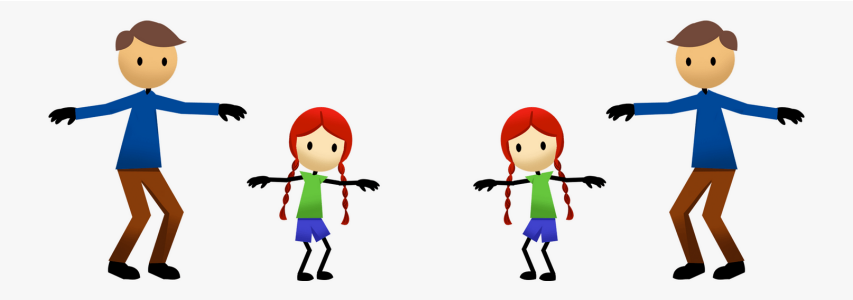
Do 3-6-year-olds prioritise social or material rewards?

Humans are great at copying other people's behaviour, and we do so even when there are no clear goals associated with the actions. This sets us apart from our closest living relatives, chimpanzees. Our study investigated the social and material priorities of children aged 3-6-years-old and their imitative behaviour. We were particularly interested in whether children would give up a material reward (a sticker) for the sake of receiving a social reward (imitating the experimenter), and whether the reward retrieval would change when the experimenter was socially engaged or disengaged from the participant.

Over three conditions, participants watched the experimenter retrieve an item (e.g., a bell) from an opaque section of an apparatus, using actions that were not necessary to get the item (e.g., tapping the lid). The apparatus also had a clear compartment with a sticker in it, but the children were not shown how to retrieve this reward. We told the participants that if they got the sticker, they were allowed to keep it. Sometimes the experimenter was engaged with the child throughout the experiment and sometimes she was not.

We found that children copied the demonstration even though it did not lead to getting the sticker and retrieved the stickerless when they were shown this demonstration. However, imitation and sticker retrieval rates did not change when the experimenter was not engaged with the child.

This study gives valuable insight into how children learn about and engage with the world they live in. Our findings support the theory that imitation is a social process that not only helps children learn new skills but also facilitates the relationships they have with others.



Help us understand how monolingual and bilingual children learn to count?

The development of counting is important in a child's cognitive development, as it provides a foundation for future achievement in formal mathematics and problem-solving. In two studies, we are interested in understanding how monolingual and bilingual children learn to count.

In the first study, we are exploring how 18-month-olds distinguish between correct and incorrect counting through visual preference. This involves the child watching a short video of fish being counted, with the parent sitting next to them.

The second study explores how 2½ to 5-year-olds develop patterns of counting, which involves playing some fun counting and iPad games.

Both research sessions take up to 30 minutes, and parents also complete a survey on the child's language and counting exposure at home. Children receive a certificate and a small gift for participating.

These studies are still underway. If you would like to participate in this research, please contact Kate Macklin at kate.macklin@uq.net.au. Weekday and weekend sessions are available.

Participate Now! **W:** ecdc.psychology.uq.edu.au **E:** ecdc@psy.uq.edu.au