



THE UNIVERSITY
OF QUEENSLAND
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Early Cognitive Development Centre
School of Psychology



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ECDC RESEARCH RESULTS



All of us at the ECDC would sincerely like to thank you for participating in our studies during 2017. You have helped increase our knowledge about children's development, and also assisted our students in obtaining their degrees at both the postgraduate and undergraduate levels. We hope you will enjoy reading about our recent research results.

Exciting news! We have now moved downstairs to bigger and better premises on level 2 of the Psychology Building. We look forward to welcoming you to the new ECDC space when you next participate in one of our studies. For more information, please check out our website ecdc.psychology.uq.edu.au

6- to 9-year-olds are practising longer when imagining their future feelings

Practising skills for the future is critical for children's success both at school and in extracurricular endeavours such as sport and music. But practising new skills can often be difficult and boring for children, especially when the activity is not inherently enjoyable (e.g., practising scales on the piano).

Parents often need to nag or use extrinsic motivators to encourage their children to practise, which can be frustrating for both parents and children. So, at the ECDC, we set out to find an alternative (nag-free) way parents might motivate children to practise for longer.

As adults, we often put off things we'd rather be doing to do things we know will be good for our future selves. For example, we may get out of bed extra early to exercise, or avoid that second slice of cake for the sake of our diet.



What often motivates us to do these things is the anticipation that we will be happier in the future. Our future feelings can be incredibly motivating. We will work hard to achieve something we believe will make us feel good (like winning our running race on the weekend) or to avoid something we believe will make us feel bad (like being unprepared for a presentation we have to give).

In this study, we wanted to examine whether anticipated future feelings could also motivate young children to practise longer for a future event. Over 150 6- to 9-year-olds participated in this study in 2017. We presented children with three skill games and told them they'd be tested on one particular game later on. Then, without telling them to practise, we left children alone for 5 minutes to play with the games. We expected that children anticipating their future test would spend most of this time practising the game they would be tested on.

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But before we left them alone, we asked kids to imagine a scenario in which they successfully completed the future test. Here we had two conditions. Half of the children were asked to imagine how they would feel if they were successful in their future test and the other half were just asked to imagine being successful without any mention of emotions. We predicted that children who were asked to think about their future feelings regarding success would be more motivated to work towards achieving that success than children who didn't consider their future feelings, and consequently would practise for longer.

And indeed, this is what we found. Children considering how they would feel in the future practised their test game 60% longer than children who didn't. This difference was especially large for 8- and 9-year-olds, where children in this age group who imagined their future feelings practised for almost twice as long as children who didn't!

Our findings show that encouraging children to think about their future feelings may be an effective way to get them to practise, particularly for children aged 8 and older (younger children may struggle to reflect on their past and future feelings).

4-year-olds tend to give less to a child in need, after witnessing high economic inequality

Economic inequality refers the concentration of a large sum of wealth in the hands of a small number of people, or a large gap between the rich and the poor.

Economic inequality has been found to affect the way adults treat other people, and has been linked to lower helping behaviours. This study looked at how this might affect children's giving behaviour.



The participating children played a series of games with six puppets and each gathered tokens during the competition.

Children were either playing with puppets who had:

- 1) a high inequality in outcomes (where some received many tokens and some received very few), or
- 2) a low inequality in outcomes (where the puppets got a relatively equal number of tokens)

At the end of the games, children swapped their tokens over for stickers to keep. We then showed children an image of a poor child and asked them if they would like to give their stickers to this child.

They also had a chance to share extra tokens with the puppets and I asked children about whether they thought the games were fair.

We found that children who witnessed the high inequality donated fewer stickers to a child in need compared to the children who witnessed low inequality. This suggests that children as young as four-years can notice economic differences and this can impact how they treat others.

Children's circles of care for others get bigger as they age

Children learn to care about the people and animals around them from an early age – they show concern for their family, friends and pets. But when do children start to expand their 'circle of care' to include people and animals that exist within the wider realm of society? How much do children care about people like policemen, teachers and the disabled? How much do they care about animals and plants? And how does this change as children get older?

We investigated when and how children aged 4-10 years become more expansive in their circles of care as they develop.

We gave children pictures of people, animals and objects that exist commonly in their society. We asked them to place the pictures on a mat with three circles - an inner circle that was for things they cared about the most, a middle circle that was for things they cared about a little bit, and an outer circle that was for things they didn't care about at all. This allowed us to get a measure of how many people and animals and objects that children cared about in each circle.

We found that as children got older, they became more 'expansive' in that they cared about more things than younger children and tended to put more objects in the inner two circles. This suggests that, as children age, they begin to care more and more about other members of society.

Furthermore, older children began to focus on human groups in particular in their circles, caring more about them than other forms of life, and began to value vulnerable members of society, such as the sick and needy, much more.



Finally, the level of care children showed on this task directly predicted the number of stickers they donated to another child they would never meet.

This research can help us understand how children's concern for others develops, and has provided some fascinating insights into the people and animals they most value. We hope to continue on with this work to learn more about children's circles of concern and how they grow.

Can 4- and 5-year-olds remember a solution to a problem that will reoccur?

As adults, when we encounter a solution to problem, we seek to obtain it and hold onto it in case our problem will reoccur. Recognising that a solution will be useful in the future is necessary for innovation, as innovations are defined by their continued usefulness. We were interested to see whether children could do this.



Four- and 5-year-olds completed a series of fun tasks to see whether they could obtain a solution to problem, retain the solution knowing that the problem will reoccur, and also share the solution with others. They also read stories to see how they thought others should interact with useful tools.

Though both 4- and 5-year-olds frequently obtained the solution, they tended not to retain it for the reoccurrence of the problem. Both age groups also tended not to share the solution with others who would have stood to benefit. However, it was unclear whether this was related to their understanding of the tool's usefulness for others, or to their lack of desire to share. Though we did not find evidence that 4- and 5-year-olds hold onto a solution to a reoccurring problem, this doesn't necessarily mean they do not have this ability.

Further research is needed! In the meantime, don't be surprised if your child finds a solution to a problem, but after one use, leaves it behind!

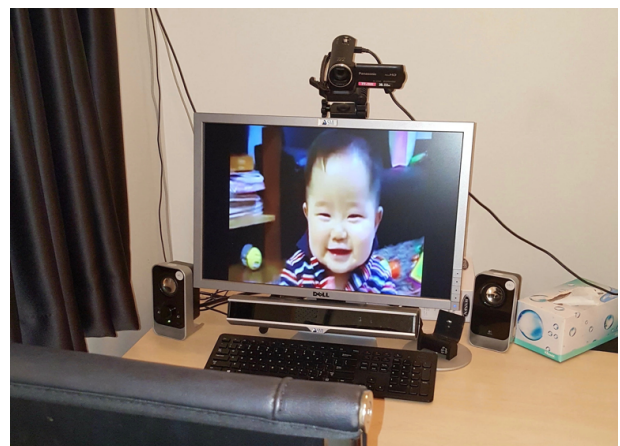
19 to 24-month-olds are responding to emotions of other infants

The way people gaze at faces, specifically the eye area, is critical for the gathering of social information and emotion recognition which may have links to empathy. The purpose of this study was to investigate the way infants gaze at, and react to, emotions to gain insight into early empathic development.

Infants aged 6-13 months and 19-24 months were presented videos of other infants displaying a range of emotions and expressions while their eye gaze and emotional responses were recorded.

Results showed the 6-13 month olds were reacting to these videos, but were not mimicking emotions as expected. By 19-24 months, infants were beginning to react positively or negatively according to the emotions presented.

Interestingly, both age groups gazed longer at the mouth area during emotional expressions, which may indicate this is where infants are most readily recognising emotions. Yet similar to findings in adults, infants gazed to the eye area the longest when no emotional expression was shown.



Children aged 4-5 and 7-8 years don't like when their group does the wrong thing, but still copy them

We know that children care a lot about doing the right thing and helping others, and will even actively avoid those who do the wrong thing. But we also know that they tend to like people who are like them - their in-group - more than those who are not like them. Children share with in-group members more, prefer to learn from them and are more likely to think that their in-group would do the right thing compared to another group.

This research looked at how children responded when these two things were in conflict with each other – how do children react when their in-group does the wrong thing? Past research we've conducted has shown that when a child's in-group does the wrong thing, 7-year-old children will report disliking them, feeling less similar to them and wanting to change out of their group.

In this study we wanted to explore how these preferences might affect children's tendency to copy the behaviour of their in-group. We asked children, aged 4-5 and 7-8, to draw a coloured token out of a bag. They were then assigned to that colour group to play a game and we gave them a headband and wristband in the same colour to wear. We showed children videos of people in their in-group (wearing the same colour) doing an harmful action and the other group (wearing a different colour) doing a helpful action. We had each group show a different way to complete a separate task - opening a box or threading beads onto a necklace. After seeing the videos, children were given a chance to have a go at the task they had just seen people do. We also asked them how much they liked their in-group and the other group before and after they watched the videos.

We found that children changed their opinion of their group when they saw them do something harmful. Before seeing the helpful and harmful actions, children liked their in-group more than the other group. However, after seeing their in-group doing something harmful, they reported liking their in-group a lot less - even less than the other group! Surprisingly, however, children tended to copy their own group on the task, even though they had just reported not liking them.

This shows that children can use helpful and harmful behaviour as a guide for how much they like other people. However, their loyalty to their in-group is so strong that they will continue to copy their in-group even after the in-group has behaved badly. This demonstrates the complex nature of social situations for young children and helps us learn about how they balance two important desires: to be a part of a social group and also to do the right thing.



Can 4- and 5-year-olds understand probability?

As adults, we rely on our ability to conceive of potential future events (termed *episodic foresight*) and some understanding of probability to guide our future-oriented decision-making. For instance, we might consider the next day's weather and decide that the likelihood of it raining is high and we therefore pack an umbrella. This kind of preparation is an adaptive way for us to maximise our limited resources by acting on the most probable future event.

To date, no research has looked at the emergence of this capacity in young children. Therefore, our understanding of when and how the ability to make rational decisions about future events develops is limited. The present study aimed to test whether 4- and 5-year-olds have the ability to choose a high probability option when they are presented with a potential future event with multiple outcomes.

The children were presented with three coloured tubes that corresponded to a sample of coloured balls that differed in terms of their frequencies. In the first instance, there were many black balls, some white balls and very few grey balls. This means that balls could be caught from the black tube with a high probability, from the white tube with a medium probability, and from the grey tube with a low probability. Children were then given two buckets and asked to “catch as many balls as you can”. They were told that catching more balls meant more stickers at the end of the study.

We found that both 4- and 5-year-old children could make the rational probability choice on their first trial (i.e., in this example they selected to place the bucket under the black and white tubes). However, on subsequent trials children did not maintain this optimal response and often placed the bucket under the low probability tube. However, 5-year-olds were more likely to make higher probability responses across trials than were 4-year-olds.

This pattern of results suggests that perhaps this capacity is not fully developed in the preschool years, and future research is needed with older children to determine when and how it matures.



We are in the same group! The effect of group membership on children's compassion

This study explored young children's compassionate capacity. We were interested to see whether group membership would increase children's prosocial behaviour .

In the study, children and puppets completed their own set of tasks for the opportunity to win a sticker after each task completion. In all instances, the puppet always lacked the resources required to complete the tasks. Subsequently, it always acted upset. We were interested to see whether children would help a distressed puppet when there was a cost to doing so (i.e., giving up their own resources and the chance to win stickers). This act would be considered compassionate as it is selfless and is aimed towards alleviating the puppet's suffering. We found that being in the same group as the puppet did not increase children's compassionate helping.

Interestingly, we found that being in the same group as the puppet led children to disengage more from the puppet's distress (e.g., look away or play with items). We speculated that group membership makes children feel obligated to help the distressed puppet, however, children may still have a selfish desire to win stickers for themselves. This conflicting feeling lead to an uncomfortable state called cognitive dissonance. Therefore, children's disengagement may reflect their attempt to self-regulate this discomfort.

Research suggests that older children may have more advanced self-regulation strategy to inhibit selfish desires and act compassionately to help a group member. Future research can extend this study to explore this possibility by repeating this experiment with children from an older age range.



Kiki the Koala



Kara the kangaroo



Coco the Crocodile



Sorting task



Marble Task



Puzzle Task

2- year-olds are beginning to understand emotions

Empathy is an important interpersonal ability that helps us navigate social situations and create healthy relationships. Empathy has been found to drive prosocial behaviour in adults, but it is unclear if this relation exists in infants.

This study aimed to investigate the relation between empathy and prosocial behaviour in infants around 20-months-old. Infants took part in three prosocial behaviour tasks designed to examine their propensity to help (pass the experimenter a dropped item), share (share their snacks with the experimenter), and comfort (comfort the experimenter when they feigned hurting their finger). Infants' empathy was examined by assessing their emotional contagion (the ability to "catch" the emotion someone else is displaying).

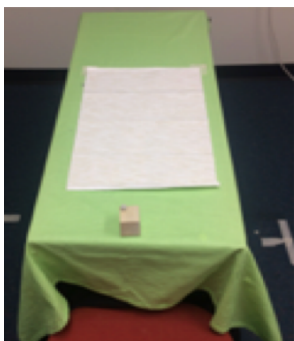


It was observed whether infants would adopt sad and joyful expressions when viewing videos of other infants crying and laughing, respectively. Infants showed signs of emotional contagion and this appeared slightly stronger for positive emotions. Furthermore, greater positive emotional contagion was associated with greater propensity for comforting behaviour.

A portion of infants in the current study had returned from a 2016 study, which also examined emotional contagion, in 6- to -12-month-olds. Infants' did not display emotional contagion in their first year of life and emotional responses at this time did not predict later prosocial behaviour. The results of this study suggest infants' emotional understanding and responding develops within their second year. At this stage, infants may also be more sensitive towards positive emotions. Furthermore, the emotional aspect underlying comforting behaviour appears to be closely related to empathy.

3-4-year-olds don't yet understand the concept space and property of other people

The concept of ownership is fundamental to most developed societies. This project aimed to determine whether we move differently within our own space, compared with space 'belonging' to another person. We predicted that both adults and 3- and 4-year-old children would be inclined to use a larger area of a self-owned space rather than an someone else's space.



To represent space, we gifted participants with a placemat (see image). We measured how they positioned a small cube on their own placemat and on another placemat that we owned. We found that adults positioned the object further away and lifted it higher in a self-owned space compared with our space.

Contrary to predictions, the effect was not observed in the children we tested. We believed that these 3-4-year-olds were perhaps too young for the concept of

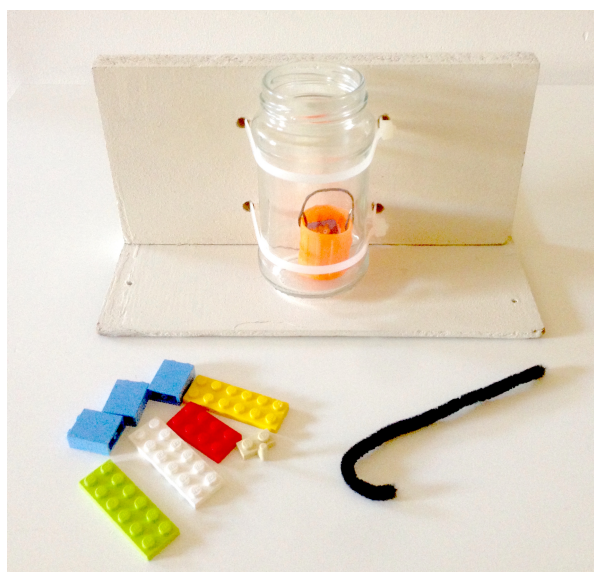
ownership to emerge, so we will keep testing to determine at what age the differences in-space ownership becomes evident.

The results of these future studies are hoped to provide valuable information about social behaviour, and how children react when they have to deal with space and property of other people.

Do 4-6 year-olds use an inefficient tool just because they're told to?

Different cultural groups develop a vast diversity of problem solving methods that are suited to their living environment and style. Yet, when we move to a new environment or cultural group, we may change our usual ways of doing things and trouble ourselves to learn the ways of the new group. If cultural diversity is to be maintained across different groups, then group-specific skills and conventions need to be passed on to future generations effectively. Some hints come from previous research that suggests children copy the normative way of doing things, even when it's not the most effective .

However, there are instances when the motivation to use the most efficient method is stronger than the motivation to conform with our own group. This project aimed to examine whether children would adopt and learn a normative way to complete a task, or select a more efficient and less effortful way that is readily available.



Four- to 6- year old children were shown sub-optimal and optimal ways of retrieving a sticker out of two apparatuses. Children were required to lift a bucket from a tube, and to push a container out the side of a box. They could either build a tool (using Lego or magnets) or use another readily available tool (a pipe cleaner or a stick) to complete the tasks.

Both methods result in successful retrieval of a sticker, however one method is less efficient than the other. The less efficient method is always taught to the children as the normative (i.e., socially preferred) way.

This project is still in the process of being completed, however we do have early results. Initially studies revealed that most children chose the optimal way to complete the tasks. Children adopted the efficient method to solve the task rather than the normative, inefficient method. However, when demonstrations were shown on a computer screen, the majority of the children chose normative, inefficient method to complete the tasks.

These early findings are unexpected but indicate that children seem to pay more attention to conventional/ cultural information in screen learning and focus on instrumental/functional information in live learning.