Theirworld

Edinburgh Birth Cohort

Summer 2025

NEWSLETTER

Welcome,

to the latest edition of our newsletter. We're busy welcoming families back for study visits and in this edition, we highlight what junior scientists aged 5 and 7 years can expect to make their visit a fun and enjoyable experience!

They can also learn more about the science behind movie watching in the brain scanner, in an article written by the TEBC team and published in a science journal specifically for young people.

We're delighted to share news of various achievements by PhD students Calvin Hew, Rebekah Smikle, Katie Mckinnon and Selina Abel.

Research findings this time highlight the analysis of movement and behaviour in 9-month-old term and preterm born infants.

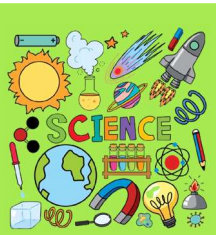
Finally, with the summer upon us we have a few science-themed activities that kids might enjoy giving a go!

A huge thank you to everyone who takes part in TEBC and shares their time with us, it's much appreciated.

Warm wishes, the TEBC Team.

Science Ideas and Experiments

A few science-themed activity ideas that kids might enjoy trying over the summer on page 6.



Student News

PhD student, **Calvin Hew** has been awarded funding by the Scottish Imaging Network to support a visit to researchers in Finland. Calvin's PhD focuses on a tool called 'tractography' (visualising and mapping pathways of nerve fibres and their signals in the brain). He will be working with the researchers who developed this tool to better understand how it can be successfully used with infant brain scans.

Congratulations to **Katie McKinnon** and **Selina Abel** who were awarded PhDs! Katie and Selina will be familiar faces to many of you who have attended a visit over the last few years.

PhD student **Rebekah Smikle** attends the Neonatal Society and wins award for best presentation.

More about Katie, Selina and Rebekah's achievements on page 4.

News

Visits at 5 Year and 7 Year

We have junior scientists turning 5 and 7 years old. A very warm welcome awaits everyone, here's what else they (and parents) can expect:

Flexible visits, including weekends

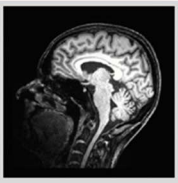
Watch a movie in the scanner

Snacks, lunch and drinks provided

A photo on the scanner

Play fun games with toy prizes

Printed image of your brain



A photo with Big Green Bear

Surprise storybook to take home

Results of clinically relevant findings

£20 to spend in the shops

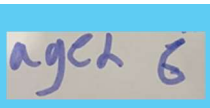
Travel expenses covered

Between visits

'*I loved the way Theirworld gave me prizes and the movies. I also liked the games.'* Participant, aged 6 years.

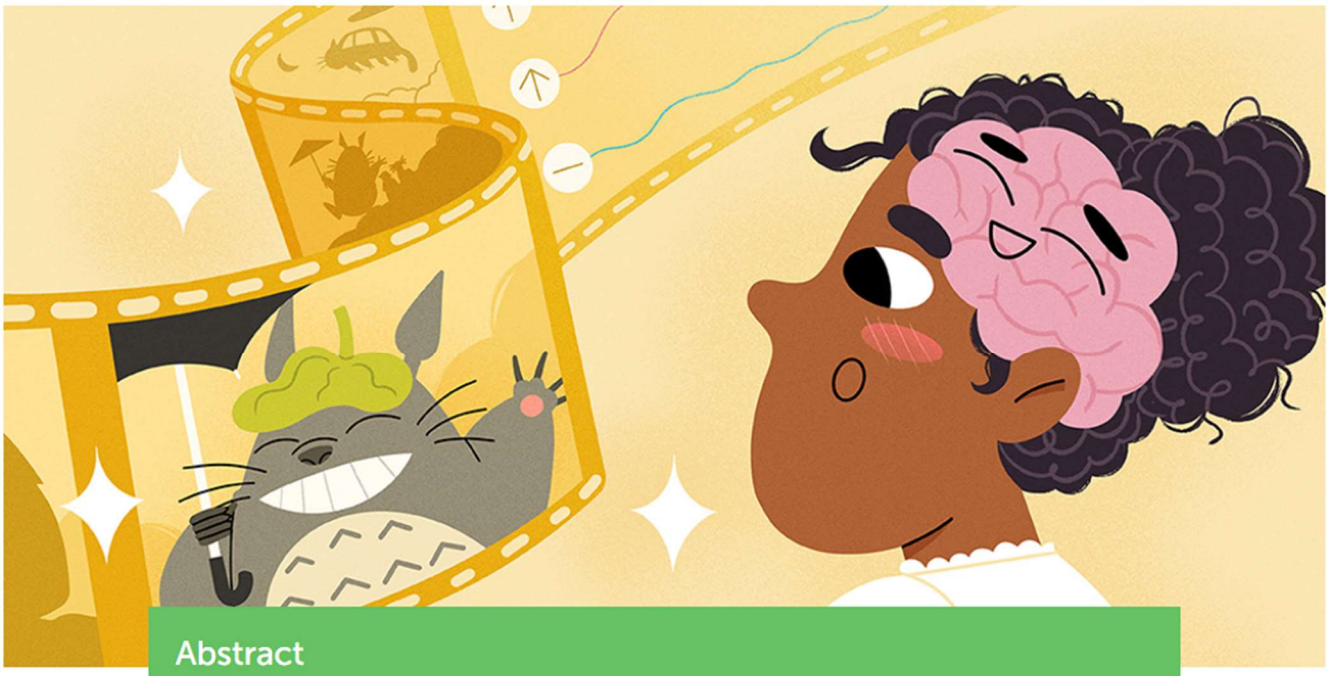
'Everyone is great with the children. Communication is early which allows me to plan & organise visits - Thank you!' Parent.

'After the study visit, I got a phone call about findings on the questionnaires. I found this extra time and support useful because my child was being assessed for ADHD and I was able to use the information and take it forward.' Parent.



Behind the Scenes: Using Movies to Study the Human Brain

Ever wondered why you watch movies when you're in the brain scanner? For junior scientists (and parents) who would like to understand more about this, the TEBC team have written an article about just this. It's in a journal for young people called Frontiers in Young Minds. There's a short summary below, use the QR code to access the full article.



Abstract

What happens inside your brain when you watch your favorite movie? Maybe you wonder what the character thinks or wants to do next? Since characters in movies often act like we do in real life, scientists can use movies as "experiments" to study how our brains work. In this article, you will learn about how scientists have examined people's brains, using a technique called functional magnetic resonance imaging (fMRI), while the people were watching movies. These experiments help researchers learn about what different parts of the brain do and how brain regions work together in both adults and young children. Movie fMRI experiments have made it more fun to take part in studies and have helped researchers learn how the brain works in "real life" as well as in people who find it hard to take part in other types of fMRI experiments.

Rebekah Smikle Presents at Society Meeting

PhD student, Rebekah Smikle recently presented TEBC research findings at the Neonatal Society's Summer Meeting in Birmingham.

Rebekah talked about certain biological markers, called EpiScores, that may be linked to children's cognitive abilities at ages 2 and 5 years. These EpiScores were developed from saliva samples collected from TEBC babies around their due date. EpiScores are based on epigenetics which explores how the environment and experiences affect how genes in your DNA are used, without changing the DNA itself.

Rebekah's presentation was titled 'Neonatal methylation-based predictors of childhood cognition', and she was awarded the prize for Best Presentation by a Trainee.

PhDs Awarded

Congratulations to Dr Katie Mckinnon who completed her PhD! Katie's research focused on preterm birth, socioeconomic status and neurodevelopment. She has already published multiple findings from her PhD (you can find summaries of her research on the TEBC website) and also won the Women in Neuroscience UK, Rising Star Postgraduate Award 2024. She is now back working in London neonatal units, and continuing research into neonatal neurodevelopment. She misses Scotland and hopes to come back soon. *(Photo: Katie and Rebekah at the Neonatal Society Summer Meeting).*

Congratulations to Selina Abel who also recently completed her PhD! Selina's research focused on the impact of preterm born children's early social environment on their neural and behavioural social cognitive development. She thoroughly enjoyed meeting so many junior scientists at the 5-year appointments! Selina plans to pursue a career in research and we wish her all the very best for her next steps!

Research Findings

We have published over 50 research papers using data from the study cohort. Summaries of all our published research findings are available on our study website. Use the QR code to find more on the website.

Computational dynamic analysis of movement and behaviour in 9-month-old term-born and preterm-born infants.

Background Information
Babies born prematurely, before 37 weeks of gestation, may experience difficulties with motor coordination, and social and emotional adjustment.

When studying movement and behaviour in natural environments or in laboratory observations, researchers tend to focus on the average of a movement quality (e.g., kinematic acceleration) or the amount of a type of behaviour.

There have been advances in computational methods that quantify motor kinematic dynamics, in other words patterns of change from one moment to the next. One such measure is entropy, which measures how complex a signal is. Similar methods have been applied to behavioural data, although these are still relatively novel.

Previous work suggest that entropy is sensitive to context and motor development, and that lower entropy may potentially capture stereotypical movements or generic developmental risks. In this proof-of-concept study, we use computational dynamic measures to investigate movement and behaviour in contexts where infants respond to different levels of social interaction and emotional stress.

Research questions
Do motor kinematic dynamics and behavioural dynamics differ amongst babies born prematurely and babies born at full-term?

How does context (differing in social interaction and stress levels) affect these motor and behavioural markers?

Image: Placement of 5 sensors on an infant's torso, wrists and ankles. Black ovals mark the location of sensors hidden in clothing.

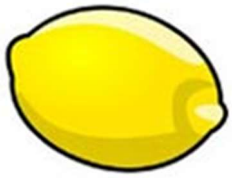
Findings
Motor kinematic dynamics were sensitive to social interactive and emotional demands in both groups of babies.

We also found greater left ankle and torso entropy amongst babies born prematurely compared to babies born at full term. This pattern of difference potentially reflects differences in motor development and cerebral lateralisation in babies born prematurely, rather than an indication of stereotypical movements or being at developmental risk.

We did not find differences between groups or between contexts, when analysing the behavioural dynamics.

Conclusion
We found preliminary evidence of differences in movement dynamics between babies born prematurely and babies born at term. Measures of movement dynamics are scalable to real-world data collection and can be useful early markers of developmental health, but our findings still need to be replicated in larger samples and validated. Furthermore, analysis of behavioural dynamics still requires methodological development.

Science Ideas and Experiments

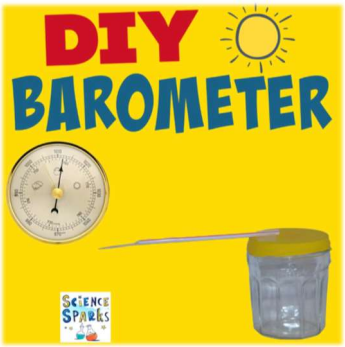


Invisible Ink with Lemon Juice

Making invisible ink is a lot of fun, you can pretend you are a secret agent as you keep all your secret codes and messages hidden from others. All you need is some basic household objects and the hidden power of lemon juice.

Making Prints with Sun Print Paper

A simple children's science activity - watch the magic of cyanotype using sun print paper to create some amazing prints. Cyanotype is a photographic printing process that uses the sun to create wonderful cyan-blue prints.



How to Make a Barometer

This mini science investigation shows you how to make a DIY barometer to measure air pressure. Air pressure can be used to predict the weather and is one of many factors meteorologists use to predict the weather.

Place to Visit

Located in Edinburgh, Dynamic Earth is a science centre and planetarium. Interactive and immersive, it tells the story of planet earth and has a 360° planetarium. Book online for best rates. Annual pass, concessions available and under 4s go free.

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