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Dr Evelyn Law, an assistant professor with the Yong Loo Lin School of Medicine at the National University of Singapore and a principal investigator with A*Star, with her daughters (from left) Amaya Qi Ru Sugihara, 12, and Neyla An Lin Sugihara, eight. She is the lead author of a longitudinal study that tracked 506 children and the effects of their screen use over nine years. ST PHOTO: LIM YAOHUI

WHAT YOU NEED TO KNOW ABOUT SCREEN TIME

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Device use in kids is linked to impaired brain function and may affect learning later on. Here are some ways to mitigate the ill effects of screen time

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A recent local study found that excessive screen time for infants is linked to impaired brain function in the near term and can possibly affect learning for years after that.

The longitudinal research tracked 506 children at three points over nine years.

At 12 months, parents reported their infant's average amount of screen time. At 18 months, the brain activity of the children was collected using a test called EEG, or electroencephalography, that tracks changes in brain activity.

At nine years old, the children participated in various cognitive ability tests that measured attention span and executive functioning, or what is sometimes known as self-regulation skills, such as self-control and ability to focus.

Through the brain scans at 18 months, researchers found that kids who were exposed to longer screen time had more "low frequency" waves, indicating a lack of cognitive alertness.

The increase in screen time corresponded with an increase of the "less alert" waveform.

When the children were put through cognitive ability tests at nine years old, researchers found that more cognitive deficits were measured as the duration of screen time increased.

Children with cognitive or executive function deficits often have difficulty controlling impulses, sustaining attention, or following multi-step instructions.

Lead author Evelyn Law, an assistant professor with the Yong Loo Lin School of Medicine at the National University of Singapore and a principal investigator with A*Star, has always been interested in how environmental influences can change a child's neuro-development, especially after she became a mother of two girls, now aged eight and 12.

Dr Law, 42, said when her elder daughter was young, she would give her screen time so that she could get things done.

The girl was later diagnosed with significant attention problems.

Dr Law said that while there was a history of attention deficit hyperactivity disorder (ADHD) in the family, she went through the usual guilt that came with all diagnoses.

"As a mum, I'm always thinking, 'Did I do anything wrong?'" she said.

That led to a deeper interest in conducting research on screen time and its impact on children.

"I wanted to study the benefits and the cost to society and families, and what parents can do about it," said Dr Law.

How does excessive screen time impact learning?

A: The study found that excessive screen time for infants is associated with executive function deficits, such as inability to persist in a hard task, at age nine.

CONTINUED on C2

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Busy parents who give their children screen time on some days can maintain a balance by spending more time with them on other days – without devices. PHOTO: ISTOCKPHOTO.COM

How can parents mitigate excessive screen time?

FROM C2

Dr Law said studies have shown that executive function matters even more than IQ in terms of achievement later in life, and the lack of self-control at an early age explains many difficulties later on.

A longitudinal research in New Zealand, called the Dunedin Study, tracked the development of residents for more than 50 years and found that poorer self-control in childhood correlates with being less able to handle health, social and financial issues later in life.

In the immediate term, Dr Law said attention difficulties make schooling difficult.

"If you don't have attention, a simple piece of homework is a marathon. No matter how much the child wants to learn, the effort needed is just too difficult," she added.

Another area of executive function is impulse control.

For instance, being able to say no when offered drugs, and to stop oneself from taking money belonging to someone else or even saying something inappropriate to a friend.

"If you don't have impulse control, even though you know right from wrong, mistakes can be made," said Dr Law.

Convincing parents is a challenge because the impact of excessive screen time may not be felt at once.

"Parents should be aware that there is a direct influence on school as well as the future of the children," she said.

How reliable are these findings?

A: This is the first longitudinal study of its kind in the world whose timing coincided with the launch of the iPad tablet in 2010 – the same year the kids in the study were born.

The children were those enrolled in the Growing Up in Singapore Towards Healthy Outcomes (Gusto) cohort study since birth.

The phenomenon of using a tablet to occupy a child is fairly new. Many longitudinal studies did not start until recent years and may not have school age outcomes like this one, said Dr Law.

"Parents need to know this is not research where we ask parents to fill out a form on whether their child is doing well in school – that is subjective," she said.

In this study, the kids were followed through the years, and brought back for hours of objective testing.

"It is pretty scary that you would still see such a long-term association (with screen time)," she said.

Furthermore, Dr Law said the fact that researchers could already see changes in brain activity at 18 months is worrying.

"At 18 months we could already see that this child might have a less mature attention network. Imagine the differences after nine years," she added.

The findings show that there are benefits in parents being more involved with their children.

"Parents can't guarantee their child won't be the one (affected by the effects of excessive screen time)," Dr Law said.

Do young kids benefit at all from watching a screen?

A: When Dr Law analysed screen time for infants using data from the Gusto study, she realised that the outcomes dovetailed with prior research which showed that infants do not learn from a two-dimensional screen.

For example, if there is a cat in the house, an infant will know it exists.

But when shown a picture of the cat on a two-dimensional screen, there is no activation in the brain, said Dr Law, explaining that the child is unable to connect the picture to the cat at home.

Likewise, even when a child appears to be flipping an iPad intently, it does not mean he understands what is going on.

"He could just be absorbing scenes and lighting changes every millisecond. The brain is just getting overwhelming visual and auditory stimulation," she said.

Some parents may think that as long as the content is not fast-paced or fantastical, it is fine.

But Dr Law said children who may be talking to grandma over a Zoom call might not understand what is happening unless a parent explains to them.

"If they haven't experienced it before, the brain doesn't have a schema so they won't understand," she said.

Infants can still benefit from connecting with others – but they have to learn that through a parent, for instance, who has to point out "that's grandma", and their attention is shifted to grandma as things are explained.

As a child gets older, say at 18 months, he understands more and is able to learn more from the screen as long as it is at a suitable pace.

However, this could be a double-edged sword, as the child may mimic the content on a screen.

A study called the Bobo doll experiment done in Stanford University in California found that children learn social behaviour such as aggression through observation – children who watched aggressive behaviour on a screen later punched and kicked the Bobo doll.

Parents may think a show like Dora the Explorer is educational, as it asks children questions like "what colour is this?". But if a child answers incorrectly, Dora would not be able to correct him, said Dr Law, who added that "the best learning is still one that is two-way".

How can parents mitigate the effects of excessive screen time?

A: Dr Law suggests treating the screen as a learning tool with parental involvement, rather than as a "babysitter".

For example, if a parent has to cook and she has a 12-month-old infant, one way is to leave the infant watching a slow-paced, educational show in a play pen nearby so that she can comment meaningfully while cooking.

"This will help the child make sense of what he watched," said Dr Law.

Another way is to balance screen time with uninterrupted, focused time with the child. This could be time spent reading books or playing a fun game together.

While the screen can occupy a child, what it cannot give is nurturing, Dr Law said, adding that if screens are a risk factor, parents should counter that with "protective factors".

"It's also what you deposit with the child that matters," she said.

Busy parents should cut themselves some slack and look at the bigger picture, rather than the number of hours of screen time their child has, she suggested.

One way is to assess the amount of screen time over a week rather than in a day.

So if your child was given a lot of screen time in one day because you were busy, think about spending more time with him on other days.

"It's not about giving yourself a report card as a mother every day. Screen time is one thing, but being a responsive parent is a protective factor," she said, citing research from Harvard University that found that serve and return or back-and-forth interaction between an adult and a child has many benefits for brain development.

My older child had too much screen time. Is it too late to do something about it?

A: The good news is that executive function development does not stop maturing until a child is in his 20s to 30s. What it means for parents is that the child still has the ability to develop good executive functions, said Dr Law.

But parents need to be more actively involved and think through their child's daily experiences, building positive elements and putting in clear limits if the amount of screen time is going overboard.

Parents could be honest with the child, by sharing with him that studies have found negative effects about excessive screen time.

"Sometimes it benefits the kids to know what you're thinking," said Dr Law.

Parents can also consider implementing some rules at home to manage screen time.

Instead of giving a two-hour screen time limit, introduce a rule that says no screens one hour before bedtime or during meal times, so as to connect with the child, suggested Dr Law.

Another way is to remove devices from the bedroom and leave the phone charging outside after they sleep.

Or get the kids involved in planning more family activities such as movie night.

"It could be many different things to get one step closer. These are easier than to go cold turkey with zero screen time," said Dr Law.

Think of managing screen time as part of discipline, and be consistent about it, she advised.

"There are ways to manage it. It's just that screens are easy and available, and the child is completely engaged. But don't let the 'easiness' take away the fact that it comes with harmful effects," she said.

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