# Brain development

## Brain development affects children and young people's ability to form healthy, satisfying relationships and to flourish in learning and social environments.

### Healthy brain development

Healthy brain development is influenced by several factors, including the quality and reliability of relationships that children and young people have within and outside the family.

Although brain development tends to follow certain patterns, it's important to recognise that each person's brain develops in its own unique way.

Warm, responsive and trusting relationships help provide optimal conditions for all children and young people to learn and make sense of the world around them.

As an educator, you play an important role in supporting children and young people to help them develop in ways that support good health, wellbeing and development throughout their childhood, adolescence and into the future.

### About brain architecture

#### Foundation for learning

Brain architecture refers to the way a person's brain develops and organises itself over time. It involves the way different parts of the brain connect and work together to help us think, feel and perform various activities.

The brain's architecture provides the foundation for children and young people's learning.

Brain development occurs sequentially, with lower and more primitive areas developing first (that is, those parts of the brain that regulate body functions such as breathing, heart rate and temperature). The prefrontal cortex is the last area of the brain to mature, in adulthood. This controls higher-order or 'executive' functioning.

A baby is born with billions of brain cells called neurons. The first 18-24 months of life see a tremendous growth in neural connections. These connections form pathways of communication between neurons that support our functions and behaviours.

#### Brain development is influenced by genes and the environment

While our genes lay the foundation for brain development, experiences shape which connections are kept. For example, in supportive environments, the brain learns to manage everyday stress, strengthening connections linked to resilience. In contrast, repeated exposure to high stress without support can shape the brain's response systems in ways that affect mental health and behaviour.

This process of forming and pruning connections continues into adulthood. The billions of connections that result from this process influence children and young people's future health, wellbeing, learning and behaviour.

### How a child's brain develops

The early years are critical for brain development because of the rapid growth of neural connections at this stage. It's estimated that during the first few years of life, more than one million neural connections form every second.

#### These connections correspond with various skills

For example, when a child is learning to ride a

In collaboration with Early Childhood Australia, headspace
Funded by Australian Government Department of Health, Disability and Ageing

a bike, the skills required to ride, such as balancing, pushing pedals and watching ahead need to be stored in memory. This happens with repeated opportunities to practice these skills, so that when they ride on another day, they can do so without much thought thanks to the existing connections. If the child doesn't ride again for an extended period, they may need to make these connections all over again.

Experiences, personal connections and relationships during the early years have the greatest impact on brain development.

The brain is most sensitive to stimulation during this period, so early experiences help shape children's brain development and can have a lasting effect on mental health and wellbeing. Positive relationships and rich learning environments help promote children's development, while early adverse experiences may impact a child's progress.

**Relationships and interactions**

Most experiences occur through a child's relationship with their family and other significant adults, including early childhood educators. Positive interactions are described as "serve and return":

Serve and return describes the back-and-forth interactions between a child and adult. When a child makes a sound or gesture (the "serve"), the adult responds with attention and care ("the return").In this way, the neural pathways responsible for communication and social skills are formed.

If an adult is consistently warm and responsive to the child, the brain architecture develops in an optimal way. However, if they're inconsistent, absent, unreliable or inappropriate in their responses, this can have a negative impact on the child's brain architecture, and this may affect future learning and behaviour.

Experiences in the early years can impact the way children respond and react to the world they live in for the rest of their lives.

## Healthy brain development in early childhood

**In your daily interactions with children, you can help them develop their brain architecture.**

There are several ways in which early childhood educators can positively influence brain development in babies and children:

**Create safe and supportive environments for optimal wellbeing and development.**

- Provide a safe, inclusive and secure environment, where people are treated with care and respect.
- Provide warm and responsive care to children's physical and emotional needs.
- Build strong, positive relationships by showing an interest in a child's thoughts, feelings and experiences.
- Be inclusive of diverse cultures, abilities personalities and interests.

**Develop broader organisational and community strategies that support wellbeing**

- Regularly reflect on how the service supports children's wellbeing and how this could be improved.
- Undertake professional development on a range of topics related to children's mental health, wellbeing and development.
- Raise awareness of the importance of the early years for positive lifelong outcomes among colleagues, families and the community.

**Help children learn social and emotional skills and manage their own behaviour**

- Provide opportunities for children to learn about their emotions and the emotions of others.
- Help them manage their behaviour by being clear about rules or expectations and guiding them to manage strong emotions like anger or frustration.

- Model positive communication skills with the children at the service, as well as with other educators.
- Acknowledge children's strengths and plan experiences that cater to their development, interests, culture and preferences.

**Identify children and families who may need additional support**

- Observe and document the development and wellbeing of each child at the service. The BETLS Observational Tool can help with this.
- Become familiar with the potential signs of mental health challenges, mental health conditions (for example, anxiety disorders or depression) or neurodevelopmental disorders (for example, attention deficit hyperactivity disorder).
- Maintain close relationships with families at the service so they feel comfortable discussing any concerns they have regarding their child's development or behaviour.

**Link families with support and information services for mental health and wellbeing**

- Be familiar with local health and education professionals who can support vulnerable children and families.
- Respectfully communicate with families about their child's development.
- Raise concerns about children with their families and, if appropriate, provide them with information about relevant support networks.
- Recommend reliable and trustworthy resources (such as websites) for families to access more information about their child's health and development.

**Be You Professional Learning**

Learn more about positive and supportive environments in the Mentally Healthy Communities domain.

Learn more about social and emotional learning (SEL) in the Learning Resilience domain.

Learn more about observing behavioural and emotional changes, having conversations with families and colleagues regarding any concerns, providing access to additional support in the Early support domain.

Learn more about forming and maintaining collaborative relationships with families in the Family Partnerships domain.

## Brain development in adolescence

**Adolescence is also a time of significant brain development**

As a child grows to adolescence, unused connections in the thinking and processing part of their brain are "pruned", while consistently used connections are strengthened.

By adolescence, the amygdala – the part of the brain associated with emotions, impulses, aggression and instinctive behaviour – is well developed. However, the pre-frontal cortex – responsible for one's ability to plan and think about the consequences of actions, solve problems and control impulses – doesn't fully develop until a person is in their mid-20s. As a result, young people at times rely on the amygdala to make decisions and solve problems, particularly in emotionally charged situations.

This is why adolescents are more likely to:

- act on impulse (this may include opportunities as they stretch their boundaries and try new things, or challenges as they may take more risks or respond aggressively – or a mixture of both)
- try new adventurous activities
- explore new relationships
- misread or misinterpret social cues and emotions
- engage in dangerous or risky behaviour.

This doesn't mean young people can't make rational decisions or know the consequences of their actions.

Adolescent development involves ongoing growth that influences decision-making and responses to emotions. While this stage can help explain why adolescents may be more likely to seek new experiences or act on

emotions, it also highlights their capacity for growth. High-quality educational curriculum aims to challenge and grow adolescent brains and cognitive and emotional skills. Secondary school teachers play an important role in achieving this.

## Healthy brain development in adolescence

### How young people spend their time is crucial to their brain development

It's worth thinking about the activities and experiences a young person is exposed to (such as music, nature, culture, sports, study, social media, languages and video games) and how these can shape the emerging adult brain.

While families and communities are central to this process, schools and the broader community are also critical in providing learning experiences and activities. Schools and educators can help adolescents develop their higher-order planning, thinking and problem-solving skills through both planned activities and everyday interactions.

### Tips for strengthening positive brain connections

- Help students find new creative and expressive outlets for their feelings, to learn how to manage emotions (for instance, sport, being in nature, dance, music, art or writing).
- Help students explore the possible immediate and long-term consequences of their actions.
- Support the development of empathy by talking about emotions and how people will have different reactions to events depending on their circumstances; encourage perspective-taking.
- Help students develop problem-solving and decision-making skills by supporting them to develop a process (define the problem, work through options, consider outcomes, reward yourself).
- Be a positive role model by talking to students about how you process information and deal with emotions and challenges.
- Deliver social and emotional or resilience skills programs to students.

Often adolescents require time to process information and need instructions repeated calmly and succinctly, and some people might benefit from explanations or alternatives. Everyone will have their own unique strengths to draw on. It's often better to identify and suggest preferred behaviours rather than tell adolescents what not to do.

As with all communication, better outcomes can happen when you approach the person with empathy, when you're feeling calm, and focus on your own behaviours, language and timing as well as theirs.

## Toxic stress and brain development

### Stress can significantly impact the developing brain

Stress is a fact of life. It can have a positive influence as it helps children and young people to adapt to their environment and use new skills.

When children and young people are faced with manageable stress that's minor and temporary (such as saying goodbye to a family member in the morning or preparing for an exam), they may have a short period of elevated stress. However, this stress response doesn't last long and it can be helpful to the developing brain as it supports young people to develop resilience.

### More serious situations may activate a severe stress response

Toxic stress occurs when a child or young person experiences strong, frequent or prolonged stress. It can arise in situations such as exposure to chronic violence; physical, emotional or sexual abuse; neglect; mental illness; alcohol or other drug addiction of a family member; intergenerational trauma; or the accumulated effects of living in extreme financial hardship.

Children and young people's brains might then develop in ways to help them cope with this stress. They may respond with higher levels of anxiety or vigilance regardless of the threat

present. This takes away opportunities to interact with the environment in a healthy way.

Prolonged stress can negatively impact brain development, but nurturing relationships and supportive environments can help foster resilience and recovery. This can help individuals flourish in both their learning and development.

Find out more about stress management.

**Be You Professional Learning**

Learn more about social and emotional development in the Learning Resilience domain.

## Bibliography

Visit Brain development for a list of references for this Fact Sheet.

## External Links

Learn more about brain architecture and development.