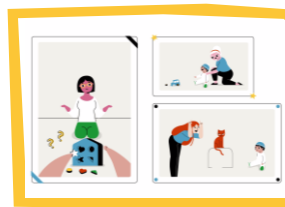


# Sharing the Science

Using metaphors to explain child development



## Introduction

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Research has shown that the British public has a limited understanding of child development. This can limit people's ability to understand how family life can be improved and how abuse and neglect can be prevented.

If people do understand child development and how it can be derailed by abuse or other adverse childhood experiences, they quickly see how the work done by services that support families can help and get a child back on track. Professionals who know these concepts have multiple ways of explaining them, which can be confusing and lead to silo working.

This booklet sets out six tested metaphors we can use to explain early child development. The metaphors were originally developed in the US by the [FrameWorks Institute](#) in collaboration with the [Centre on the Developing Child at Harvard University](#). They have been tested and adapted for use in the UK by the FrameWorks Institute who are experts in communications science. These six metaphors have been found to help people understand key concepts of child brain development and to be memorable over time and easy to repeat.

Put simply, using these metaphors can boost our understanding of child development and increase support for ensuring children and young people have healthy development and grow up in supportive and loving families and communities.

The six metaphors, which are set out in more detail in this booklet are:

1. Brain Architecture
2. Serve and Return
3. Toxic Stress
4. Air Traffic Control
5. Overloaded
6. Tipping the Scales

You can see a short animation, which explains the core story of brain development (using these metaphors) [here](#). There is also a short animation for each metaphor, and the links for these are included in the relevant sections of this booklet.



## Brain Architecture

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### Metaphor

Our brains are **built** through a process that begins before birth, and continues into adulthood. Like the construction of a house, the building process happens in a sequence – first laying the foundations, shaping the rooms and later wiring the electrical system. These things have to happen in the correct order. **Early experiences literally shape how our brain gets built. A strong foundation** in the very early years increases the chances of positive health and learning later on, while a weak foundation increases the odds of having difficulties later on. But it is **never too late to support strong brain development**. Having negative experiences early on doesn't set a child on a fixed path. No brain is perfect and there are always opportunities - that we can all take up - to strengthen a child's brain.

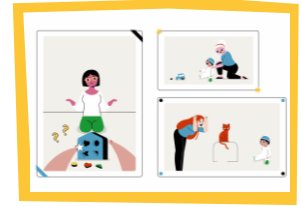
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### What it does

This metaphor can be used to make the following points:

- Brain development is an active process.
- There are two sensitive periods of development where the brain is most susceptible to change early childhood 0-5 years and adolescence 12-25.
- While the brain has a continued capacity to change and adapt, it is always better to "get it right the first time" – that is, providing the brain with the right types of experiences early on in development makes positive outcomes later in development substantially more likely.
- However, it is important to remember that it is never too late to shape how brains develop even outside of the sensitive periods of development.
- Early experiences shape brain development and provide the foundation upon which future learning, health, and behaviour all depend.
- Children's brains develop over time in a predictable, sequential pattern but traumatic experiences can impact on this development.
- Positive experiences and interactions are the "materials" that build strong brain architecture.
- Just like building materials have varying degrees of quality, the quality of a child's early experiences affects the sturdiness of that child's brain architecture.
- The metaphor allows for the recognition that intervention is possible as well as desirable and there are always benefits to positive brain building experiences whatever the age of the child or young person.

Here's an animation to illustrate the metaphor: <https://youtu.be/DpnHO3FqQGA>



## Serve and Return

### Metaphor

A vital ingredient in a young child's growth and learning (and brain development), especially from ages 0 to 5, is the "serve and return" interactions that young children have with their parents, caregivers and the people in their communities. Like the serve and return rally in a good game of tennis, young children naturally reach out for interaction with adults through babbling, pointing, imitating facial expressions etc. This process helps them develop important language, cognitive, and social skills and **actively builds** a child's brain. If adults do not respond by getting in sync with children and return these kinds of noises and gestures, the serve and return rally breaks down and the child's developmental process can be interrupted. If adults repeatedly do not respond this can have negative implications for later learning.

### What it does

This metaphor provides a useful tool to talk about children's development, clarifying understanding about carer/child interaction and illustrating what it looks like. It can be used to make the following points:

- Serve and Return interactions and building a relationship with a young child is an active process
- Serve and Return interactions are initiated by the baby/child
- To develop well, young children need to have consistent back and forth – Serve and Return – interactions with their parents/carers and other adults in their lives.
- It is important to maintain a "rally" in interaction, with proper time and attention paid to the "game".
- Serve and Return interaction is important and valuable, and can be done effectively by all adults who care for children.

When using this metaphor, one should be careful to emphasise that Serve and Return interactions refer to interactions with very young children, and these interactions crucially contribute to cognitive and linguistic development. It is important that the focus should be on the process (e.g. sharing attention, turn-taking) rather than the content of communication/interaction. People should use this metaphor, particularly in relation to interactions between adults and younger children. In order to avoid the idea that a game of tennis is "won," communicators should emphasise the language of "rallying" in their talk of Serve and Return.

Here's an animation to illustrate the metaphor: [https://youtu.be/WspJdih\\_Ijk](https://youtu.be/WspJdih_Ijk)

### Look Say, Sing Play

This metaphor is a key principle of the NSPCC's Look, Say, Sing, Play campaign which we've developed through research with thousands of families and professional consultation. We

## Metaphors summary booklet

know parents and carers are already interacting with their baby throughout the day, but we want to support them with the knowledge of how they can make the most of these moments and why they are so important. Our ultimate aim is to help parents give their child the best start in life – both by building their brain and strengthening the bond between parent and child. Parents and carers can sign up for weekly brain-building tips to help them have even more serve and return interactions with their young children throughout their daily routines, here: <https://www.nspcc.org.uk/keeping-children-safe/support-for-parents/look-say-sing-play/>.

We also have Look, Say, Sing, Play resources for professionals to use; this set of resources will help you to provide parents with brain-building tips that they can easily incorporate into their everyday routine and boost their child's development. Resources include a leaflet you can print for parents, posters, a group session plan, activity sheets and flashcard. They can be downloaded here: <https://learning.nspcc.org.uk/research-resources/leaflets/look-say-sing-play-early-years-resources-parents>)

We are also utilising the brain-building resources from [Vroom](#), a US public health initiative that uses the science of early learning to help parents improve back-and-forth interactions with their children.



## Toxic Stress

### Metaphor

Toxic Stress happens when a child experiences severe and on-going stress – like extreme poverty, abuse or violence in the community – **without consistent supportive relationships**. Toxic stress affects the way that the child's brain develops and can lead to lifelong problems in learning, behaviour, and both physical and mental health. There are different kinds of stress that very young children – say ages 0 to 5 – can experience: (i) positive stress, (ii) buffered (sometimes known as tolerable) stress, and (iii) Toxic Stress. Positive stress is that brought on by challenges that can help children develop – like facing a challenging social situation or preparing for a hard exam. Buffered or tolerable stress brought on by situations that could damage development, but the effects are buffered by having supportive positive relationships – like having strong adult support when a loved one dies. And then there is Toxic Stress, this is brought on by often prolonged exposure to traumatic situations or experiences such as abuse or neglect.

### What it does

The metaphor can be used to make the following points:

- Stress is not character building
- There are three types of stress:
  - Positive stress which is low level such as first day at school or making new friends,
  - Tolerable stress which is stress that we cannot avoid in our lives (such as death of a loved one or an accident) this stress can be tolerable when its effects are buffered by supportive carers – however without this support the stress can become toxic;
  - Toxic stress which is a prolonged and/or repeated stress response such as experience of abuse and neglect or neighbourhood violence.
- The term 'toxic' refers to the stress response a situation may cause, we do not label environments, situations or families as toxic.
- Toxic stress affects child development and mental health.
- The effects of toxic stress are long lasting and damaging.
- Toxic stress cannot be made positive, but its effects on a child or young person can be lessened and/or repaired through adequate support and removal from situations that are causing this stress response.
- Toxic stress is a serious problem that requires attention within the family and community as well as wider society.

Focus on toxic stress as chronic, and influenced by factors outside of the child's – and often the family's – control. Also emphasise the significance of toxic stress in young children's development and the potential negative effects of consistent exposure to such stressors.

Here's a video to illustrate the metaphor: <https://www.youtube.com/watch?v=YFarEj-1sGA&list=PLqA6Q-vvA4sNtS7A0ONhiXoNsHIAhTBJG&index=2&t=0s>



## Air Traffic Control

### Metaphor

Children's ability to remember, focus and pay attention – is like the air traffic control system at a busy airport. At an airport, some planes have to land and at the same time others have to take off, there's only so much room on the ground and in the air. Likewise, children need to develop their brain's air traffic control system to manage their mental airspace to complete tasks, maintain relationships, etc – **with the support of caring and sensitive adults**. These 'executive function' skills regulate the flow of information and enable children to focus on tasks, plan and prioritise, avoid collisions, and keep the system flexible and on time. A child's ability to manage competing demands is a skill that develops over time, requiring **practice and support**. There are always ways to help children develop their air traffic control skills but this should be done in a way that is appropriate to their current level of development.

### What it does

This metaphor can be used to make the following points:

- Co-ordinating mental processes including managing and filtering distractions, planning and prioritising tasks, following rules and instructions and shifting attention (known as 'executive function') are fundamentally important skills of early childhood, adolescence and adulthood.
- The development of a child's executive functioning skills is an active process, not something that happens automatically.
- The skills that comprise executive function develop over time and with practice. Just as a newly-trained air traffic controller begins at a smaller airport before working up to directing traffic at a major multi-terminal airport, children need opportunities early on to practice their executive function skills in supportive environments.
- There are two particularly sensitive periods of brain development: 0-5 years and during adolescence 12-25. Air traffic control skills are developing particularly quickly during both of these periods, and even more so during adolescence.
- One does not have to give up on a child who has under-developed executive functioning skills – which can be demonstrated through challenging behaviour. Children can be supported to develop their executive function at all ages.

This is a powerful metaphor to help people to think about children whose Air Traffic Control is less well developed (i.e. less able to manage competing demands on their attention/manage less planes), how these children might feel (e.g. overwhelmed, frustrated, anxious) and what we might see as a result of this (e.g. behaviours like forgetfulness, lashing out, or withdrawing). It's also very helpful in supporting people to think about how to support children and young people in this situation (e.g. Calm environments, a stable routine, and lots of practice, play and encouragement).

Here's a video to illustrate the metaphor:

<https://www.youtube.com/watch?v=a1NXKZAadPc&list=PLqA6Q-vvA4sNtS7A0ONhiXoNshIAhTBJG&index=5&t=0s>



## Overloaded

### Metaphor

When a lorry carries too much weight, it can be **overloaded** to the point of breaking down. And when parents are burdened with stresses like poverty or lack of support, the weight of these problems can **overload** their mental and emotional capacity to take care of their children's basic needs. Over time, carrying and managing heavy burdens puts a strain on people, and can **weaken** their ability to care for their children. When an especially large burden is loaded onto a person who is already overloaded – such as the loss of a job – it can cause a breakdown in care.

However, just as we can unload an overloaded lorry by bringing in other lorries, or moving some cargo by train instead, we can provide **social supports** to overloaded parents that **offloads sources of stress**, and help **improve their capacity to care** for their children.

### What it does

This metaphor provides a useful tool to frame messages about the causes of, and solutions to, neglect. It can be used to make the following points:

- To explain how social factors can lead to neglect and frame discussions about how societal-level solutions can address child neglect (e.g. by 'lightening the load', helping people 'manage the load')
- To explain to parents why services have been contacted to help the family (e.g. to 'lighten the load' or work through some of these burdens).

It's important to emphasise the 'sticky language' of the overloaded metaphor (e.g. 'loaded', 'stacked', 'carrying a load', 'burdened' etc.), evidence suggests people easily take up and use this language.

Many types of support can help unload parents (e.g. community and family members, support groups as well as professional services). Professionals should also be mindful of how their services could be adding to a parent's load and consider how this load could be lightened.

It is important to emphasise to parents that feeling overloaded does not mean they aren't trying hard enough or are unable to be good parents. As in the metaphor, the lorry is perfectly functional but it is the heavy load that is causing it to break down. When the load is lightened the lorry is back to full function.

It is also important to *avoid deterministic* language when talking about social factors that contribute to neglect. It is important not to overstate an absolute causal relationship between social factors and neglect. For example, 'the weight of things like poverty and violence *can* overload a person's mental and emotional capacity to manage stress' rather than 'the weight of things like poverty and violence overloads a person's mental and emotional capacity to manage stress'. (Note the absence of *can* in the second sentence.)

Here's an animation to illustrate the metaphor:

<https://www.youtube.com/watch?v=ETP7TcbC2g0&list=PLqA6Q-vvA4sNtS7A0ONhiXoNshIAhTBJG&index=3&t=0s>



## Tipping the scales

### Metaphor

Think of a child's development as a scale. The way the scale ends up tipping is like the outcome of the child's development, so we want the scale to tip towards the **positive side**. Positive things like supportive relationships, lots of love and return and 'positive stress' and calm and nurturing environments get loaded on one side. And negative things like abuse, neglect or community violence get stacked (i.e. lots of toxic stress) gets loaded on the other side. The goal of every community is to have development scale **tip positive for as many children as possible**. To do this we can offload as much weight as possible from the negative side and stack as many factors on the positive side as is possible, to tip the scale toward the positive. We know that we can give children support early to help them develop coping skills — these skills push the base of the scales over to one side and make the scale harder to tip negative even when there are experiences on the negative side. This is what we call '**resilience**'.

### What it does

This metaphor can offer a powerful explanatory tool to describe how and why the contexts, experiences and environments in which children live and grow, shape their developmental outcomes. The metaphor can be used to make the following points:

- Children's developmental outcomes and individual differences are the product of the weight applied by different risk (negative) and protective (positive) factors, different genetic starting points, and the influence of environments and experiences on these genetic starting points.
- There are multiple factors that influence developmental outcomes (e.g. families, schools, society, government etc). In particular access to resources can affect the way the scale tips.
- Protective factors can buffer the effect of risk factors — but only to a certain extent. Negative experiences stacked on one side of the scale can be buffered if enough positive weight is added to the other side of the scale.
- Outcomes can be improved in a number of ways but there are periods when this is easier to do than others (e.g. when children are younger age 0-5 and in adolescence 12-25).

Be careful to emphasise that the goal of development is to tip the scale in a positive direction (not to create balance). Use illustrations, or demonstrate through gestures and props, the process by which negative weight can be overcome by stacking positive factors to help tip the scales towards the positive side.

Here's an animation to illustrate the metaphor:

<https://www.youtube.com/watch?v=EW20A962wd4&list=PLqA6Q-vvA4sNtS7A0ONhiXoNsHIAhTBJG&index=6>

## Further Background Reading

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### Background to the science

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### Background to the development of the metaphors

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'Seeing Context through Metaphor: Using Communications Research to Bring a Social Determinants Perspective to Public Thinking about Child Abuse and Neglect' Kendall-Taylor, N., Stanley, K. (2018) *International Journal of Environmental Research and Public Health*, 15(1), 152;