Schemas

- A simple guide.

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What is a schema?

Schemas are described as patterns of repeated behaviour which allow children to explore and express developing ideas and thoughts through their play and exploration. The repetitive actions of schematic play allow children to construct meaning in what they are doing.

Schema play is how our children learn to make sense of the world.
A schema (also known as a play schema) is like a set of instructions. As adults we use them all the time, and we don't really notice we're doing it. Switch on a light or make a sandwich and you are using a schema to do it; a mental model you've created through a process of trial and error to find the best and most efficient way of completing your task.

Our schemas aren't always right. What's special about them is that they represent the current state of our knowledge. Over time, and as we explore further, we come to realise that there were gaps in our understanding. We can then modify our schema to reflect this new information. I drop a football. It bounces back up. I drop a tennis ball. It bounces back up. I have a schema that balls bounce. But one day I drop a ball of play dough and it doesn't bounce. I update my schema: balls that spring back into shape after you've squeezed them will bounce. Balls that don't, won't. Which works until I try dropping a golf ball…

Schema play is especially noticeable in toddlers. Bashing, banging, pushing, pulling, destruction testing is a key feature of this kind of activity. What does this thing do? What happens if I drop it? Will it break if I hit it? What if I hit it again? Your child wants the answers to all these questions and will persevere until she has them. She is trying to make sense of the world, one action at a time.
Swiss psychologist, Jean Piaget, noticed that children of a similar age all make the same kinds of mistakes. This led him to speculate that learning happens in stages and that as children grow, they progress to higher levels. Part of his theory considered how schema play enabled this transition. You can read more about it here.

How many schemas are there?

It depends. For our purposes we'll focus on eight, although in theory the number is limitless. Jump straight to the schema that interests you via the following links or read on for more information about schema play and why it matters.

- Connecting
- Orientation
- Transporting
- Trajectory
- Positioning
- Enveloping
- Enclosing
- Rotation

These schemas are action schemas. They help us to make mental models of movements. They help us to represent actions in our minds.

But there's another kind of schema – schemas of form, sometimes called graphic schemas. These help us understand how things are arranged. Read more about graphic schemas and children's drawings here.

Why do schemas matter?

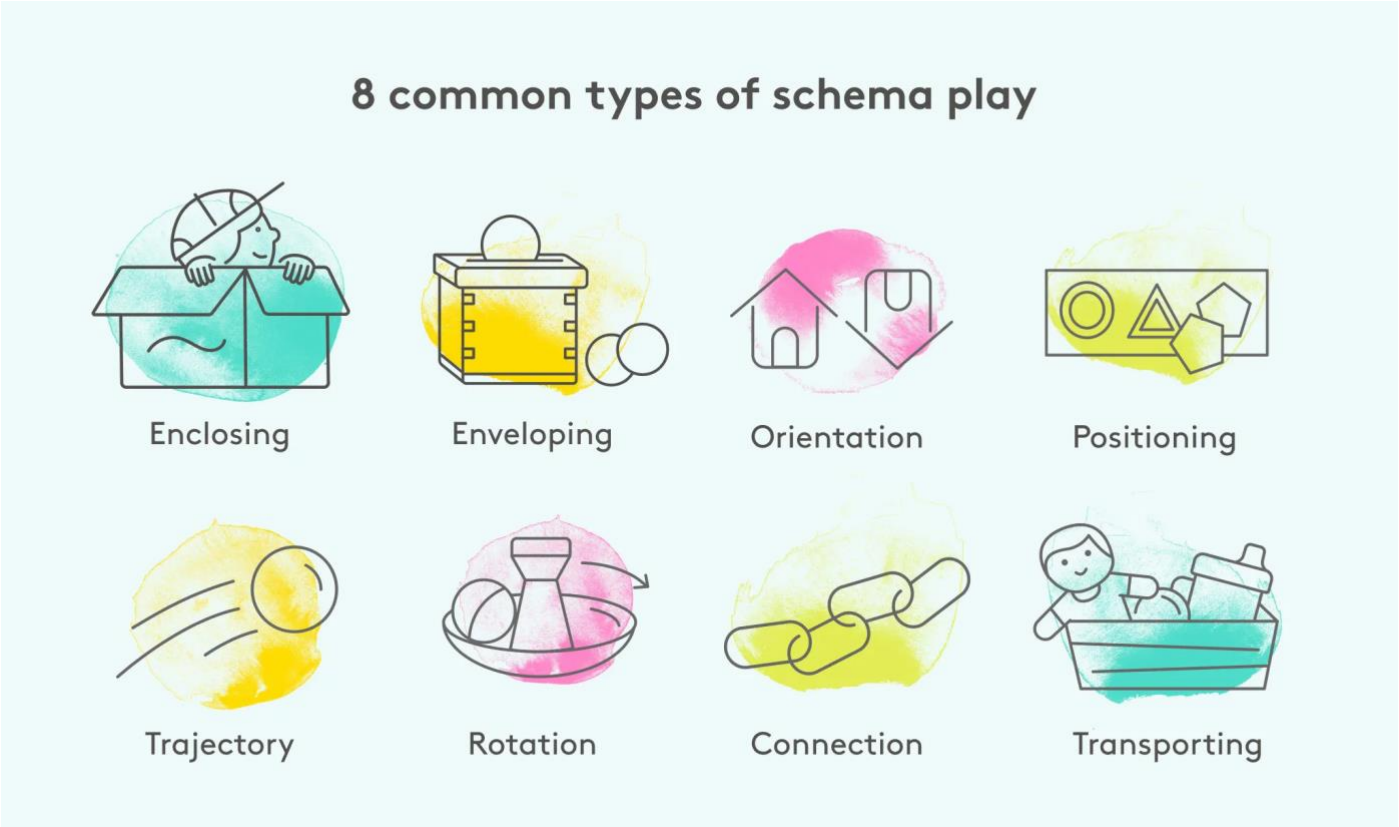
Once a child has understood a schema's physical manifestation, they are able to consider more abstract applications. For example, the concept of emailing a photo to Grandma becomes easier to understand once we have had the chance to practise moving objects from one place to another, whether that's rolling a toy car across the floor or taking a doll out of her box and putting her into the doll's house.

Children also learn by using their own bodies in schema play. The simple act of walking from one point to another helps them understand the idea of trajectory, of moving from A to B.

At what age does schema play happen?

While you see it most in toddlers, schema play is something we all indulge in when we encounter something for the first time. When you try to assemble an IKEA bookcase without reading the instructions, you are using a schema. You've built this kind of thing before; you know what to do and a little trial and error is OK. And if there's a new kind of fixing, you'll work it out. It all started when you were small, building with Lego, sticking with tape and glue. You understand how things connect.
What you won't do is repeatedly spin round like a windmill, twist door handles or watch the washing machine go round. Toddlers haven't yet fully grasped the idea of rotation, so they have to practise in order to understand the schema. Their schema play is visible. You, on the other hand, know all about it so you just pick up the screwdriver and fix the parts together.

It follows that your child's interest in a given schema diminishes over time. What seemed like an obsession is quickly forgotten once the concept has been mastered.



What are the main types of schemas?

Trajectory schema

Does your baby like to repeatedly drop their food from the highchair, or throw things out of their buggy? Or does your toddler enjoy watching things swing from side to side (like a pendulum on a clock), blowing bubbles, playing catch or making paper airplanes? Then they are exploring their trajectory schema, studying the movement of an object, or their own body, through the air.
For the adult serving dinner, a baby's joy in hurling their food on the floor is sometimes hard to share, but comfort can be found in the knowledge that your child is involved in important scientific exploration. Will it smash, will it splat? How long will it take to reach the ground? These early attempts at understanding and manipulating trajectory develop into the more familiar skills of throwing, catching and kicking, and eventually to driving, tennis and sending rockets to the moon.
TRY THIS:

- throwing at a target
- chasing games like tag
- pushing a toy off the table and seeing where it lands
- roll cars down a ramp.
- wooden railway
- cars
- balls

Read more about the trajectory schema.

Connecting schema

Joining train tracks, building towers with Lego or wooden blocks, sticking things together with tape – these are all signs of the connecting schema. Perhaps your child likes to join arms with you or other people, to be physically connected somehow.
Connecting also includes disconnecting, which is why a child might build a tower of blocks, only to knock it down afterwards – or knock down someone else's.
In exploring the idea of connection your child is beginning to understand how certain things come together and others fall apart, ideas of strength and magnetic force, stickiness, purchase and slippiness are all understood through connecting.
Understanding that this is a normal urge and allowing it to happen in a safe environment will give your child many happy hours of play.

TRY THIS:

- holding hands
- paper chains
- collage and junk-modelling
- threading beads
- lego, duplo, octons, connecta straws
- sellotape, glue, stapler (under supervision!), blu-tack
- wooden railway

Read more about the connecting schema here.

Transporting Schema

Is your child often very busy carrying goods from one place to another? Is the walker always full of bricks or the basket full of teddies? If this sounds familiar, then your child is exploring their transportation schema. In transportation, children like to move items from A to B – simple as that. Transporting is very rewarding for the young child since they gain a lot of pleasure from completing a task and seeing something happen as a result of their hard work.

You can support the transportation urge by having plenty of useful transport tools around: pushchairs, walkers, baskets and bags are all great. Transporters can be very helpful people, so if you are unpacking the shopping and need someone to put all the apples in the fruit bowl or take the toilet rolls upstairs, here's your labour. Gardening and water play are also great opportunities to explore transporting – wheelbarrows and buckets will always be played with. To add an element of fine motor development to the transporting urge, focus on moving smaller items which require picking up with fingers such as conkers, acorns or pebbles.

Read more about the transportation schema.

Enclosing Schema

Closely related to the enveloping schema, but with its own distinct character, the enclosing schema is about creating boundaries.

Does your daughter like to create enclosures for her toys? A farm fence made from blocks or string. Perhaps your son enjoys drawing circles, looping the line around smaller marks already on the page. At first glance, the enclosing schema seems very similar to enveloping. Both involve closing around something, but that's where the similarity ends. Whereas enveloping wraps an object, often removing it from sight, enclosing simply contains it. It's the difference between a doll bundled up in blankets and a horse in a paddock.

Enclosers likes to draw faces, placing the eyes and mouth inside, hair and ears outside. An enveloper's drawings, on the other hand, focus on making things disappear. They might draw a pretty scene only to obliterate it completely with paint, covering the entire page with a single colour. Nothing of the original remains.

When children enclose, they are learning that objects – or ideas – can be contained in a discrete space. And that anything outside this is a separate entity.

Eventually, enclosing leads to letter-formation. The balled fist that first holds a crayon, making endless spirals on the page eventually becomes the dextrous hand drawing circles for 'o' and 'p' and 'd'. It's also central to drawing faces and bodies. Leave a gap and there's a space for the colouring-in to leak out.

Like all schema play, development of the enclosing schema happens naturally. But if you know to look out for it, you can provide opportunities to practice and improve.

Read more about the enclosing schema

Positioning Schema

Does your child like to arrange her toys just-so? Does he spend hours lining his cars up in a row or find pleasure in creating scenes or displays? Then your child is exploring their positioning schema. Positioning provides early foundations for many key skills and activities, from laying the table and placing shoes under pegs, to creating patterns in maths and maintaining neat work in schoolbooks.

To support a blossoming positioning schema try collecting shells and pebbles on the beach, or sticks in the garden, and see if you can create a symmetrical pattern with them. You could gather friends or family and arrange yourselves as an imaginary bus and play games like rounders that involve positioning. For fine motor development, balancing games like Jenga and connect 4 are great, as is creating patterns with threading beads and simple stacking and construction with blocks or Lego.

Read more about the positioning schema.

Enveloping Schema

Does your child love to make dens, climb into boxes or dress up in layers of clothing such as multiple necklaces or lots of hats? Or do they enjoy filling empty boxes with bits and pieces, wrapping dolls up in blankets or creating homes for their toys? If so, then they may be exploring their enveloping schema.

In this schema your child is trying to work out what happens if they wrap or hide an object. Can I still see it? Can I feel it? What if I wrap it in translucent fabric? Or paper? Or put it in a cupboard? Is it still there when I open or unwrap?

A child investigating the idea of enveloping may repeatedly drop your keys behind the radiator or open the bin and look inside.

If you think your child is an enveloper, here are some activities to support their investigations:

- Use posting toys, Russian dolls, nesting toys and shape sorters
- Wrap up baby dolls in blankets
- Play doctors or vets with plenty of bandages
- Make sock or glove puppets
- Wrap up parcels (Christmas is great for envelopers!) and use paper, newspaper, string, sellotape, ribbons.

Read more about the enveloping schema and how it relates to object permanence and attachment. And read about enveloping's closest cousin, the containing schema.

Rotation Schema

When children twirl around, roll down a hill or just wind their hair around a pencil, they're exploring their rotation schema. Anything circular – wheels, twirly straws, being swung around by a grown-up, watching the washing machine, ring-a-roses: these are all experiences of rotation.
This exploration and understanding of the infinity inherent in circles lay the foundations for everything from rotational symmetry in mathematics and rotating magnetic fields in secondary school science, to dancing at the disco or passing parcels at the party. It It all started at six months when you dropped a ball and watched it roll away.

Some good rotation-supporting activities include:

- Connect nuts and bolts
- Wheels on cars, trains and bicycles
- Twirl streamers
- Use screwdrivers and spanners (under supervision!)
- Make pinwheels
- Turn keys in locks and padlocks
- Draw spirals in sand or with finger paint
- Mix and whisk cake ingredients.

Read more about the rotation schema and learn about the four levels of schema understanding.

Orientation schema

If your child likes to swing upside down from the monkey bars, lie along the top of the sofa or sit in the trolley facing the wrong way at the supermarket, then they are exploring their orientation schema. In orientation, your child is discovering how to see things from a different point of view. This important schema builds confidence in many physical activities and games, when it becomes useful to anticipate how another player might move.
To support orientation schema play, try walking along walls, rolling down hills, climbing up steps and any kind of movement that requires them to find different heights or positions. Gymnastics, games like Twister, soft play, or a simple trip to the park, are also great for exploring different points of views. And of course, there is always climbing trees.
TRY THIS:

- hang upside down from monkey bars
- lie flat on the floor when playing with toy vehicles
- see the world from atop an adult's shoulders.

Read more about the orientation schema.

Other schemas

That's a long list! But these are not the only schemas.
The truth is that there is an infinite number. But the more categories we create, the harder it is to identify which schema applies. Too many and the classification becomes unwieldy. Having said that, you might like to read more about some other well-known schemas. But as you do, consider which of the main schemas they might fall under. When a theory is simple it's easier to take action.

Read more here:

- Posting schema
- Transformation schema

Final word

Schemas help us make sense of the world. They are mental models of our current thinking. We update them over time as new information comes in.
In this article, we looked at action schemas. These are how we represent movements in our minds so that we can recreate them at a later time.
But there is a second type of schema – schemas of form. We use these to help us recall shapes and arrangements. As our understanding becomes more sophisticated, we use them to draw and eventually to write.
Read more about graphic schemas here.

Further reading

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About The Author

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I'm Alexis, father of four and founder of One Hundred Toys, Get Set Five and A Year With My Child. I taught in London primary schools for thirteen years, specialising in the early years. I studied at the Institute of Education, part of the University of London, both for my PGCE and my as-yet-unfinished masters. I'm especially interested in schemas and how they help us understand the motivations behind toddlers' play.