

All about...

supporting schemas

Schemas – patterns of repeated behaviour – are key to how young children learn and early years practitioners must respond to them, says *Stella Louis*

PHOTOGRAPHS AT NELLY'S NURSERY, LONDON, BY JACKY CHAPMAN

Practice Guidance for the Early Years Foundation Stage makes clear the vital link between schemas and child development and states that practitioners should 'encourage young children as they explore particular patterns of thought or movement, sometimes referred to as schemas' [*Practice Guidance for the EYFS (2008:79)*]. So, what are schemas and how do they aid learning?

The glossary to the May 2006 EYFS consultation document defines schemas as 'patterns of repeated behaviour in children. Children often have a very strong drive to repeat actions such as moving things from one place to another, covering things up and putting things into containers, or moving in circles or throwing things. These patterns can often be observed running through their play and will vary between one child and another. If practitioners build on these interests, powerful learning can take place.'

Chris Athey, an authority on children's schematic behaviour, defines a schema as 'a pattern of repeatable behaviour into which experiences are assimilated and that are gradually co-ordinated. Co-ordinations lead to higher-level and more powerful schemas.' (Chris Athey, 1990: 37).

And Jean Piaget (1962) described schemas as 'cognitive structures'. Children learn to do an action, which they are interested in repeating again and again. Through this repetition, children gain the ability to gather and



Trajectory schema: children are fascinated by throwing

recall information, to organise and process their behaviour and thoughts and so gain knowledge and understanding of many basic concepts and the world around them.

Let's take as example, David, aged 42 months. He likes movement and is often observed playing with the diggers, cars or trains in his nursery.

When there are no transport toys available, he uses a block as a car and pretends to drive it to the petrol station, in the bathroom.

When questioned by a practitioner about his play, he explains that he ran out of petrol and needed to fill his tank to complete his journey.

Through this example, we can see how schemas operate at four different levels.

Level 1: Sensorimotor level – during this level, children use their senses, action and movements. David is using all of his senses to move himself and objects from place to place.

Level 2: Symbolic level – this is a hugely significant aspect of child development and here is exemplified by David using a block as a car.

Level 3: Functional dependency level – at this level, children have a knowledge of cause and effect. In David's case, he knew that he needed to fill his car up with petrol to make it work.

Level 4: Abstract thought level – David was able to explain verbally the significance of his actions.

So, David's interest in transporting has motivated him to learn about movement and has enabled him to understand and integrate new information about petrol and fuel.

IDENTIFYING SCHEMAS

It is important, then, that practitioners understand this natural and fundamental part of child development, because an awareness of schemas:

- provides a new way of describing children's actions and behaviours
- enables practitioners to support parents' understanding of their children's learning
- helps inform planning – schemas highlight children's individual interests, preoccupations, knowledge and abilities (see box, 'Planning for schemas', p18)
- enables practitioners to become more effective in supporting children's learning, particularly in developing mathematical understanding of height, size, space, order or pattern (see box)

To support 'The Unique Child' effectively, practitioners need to:

- identify a child's schemas
- identify the interests contained within them, and
- provide repeated, real and first-hand opportunities for the child to repeat and experiment with their schematic concepts, so that they can develop, refine and build upon their existing knowledge. ➤



Rotation schema (above): children in a spin. Enveloping schema (below): peek-a-boo

Schema clusters

Effective support also requires practitioners to recognise that schemas may differ from one child to another; whereas some children may show one schema, others may display a cluster of schemas. Professor Tina Bruce (1997) points out that ‘schemas are patterns of linked behaviours, which the child can generalise and use in a whole variety of different situations. It is best to think of schemas as part of a cluster of pieces which fit together.’

TYPES OF SCHEMA

In the rest of this article, we look at examples of schematic behaviour, the learning that stems from it and the kind of support that practitioners should build into their planning.

Trajectory

Examples Joseph (10 months) and Glenn (36 months) are both interested in trajectory. Joseph is very active; he spends most of his time bouncing and throwing things, or knocking over structures built by other children. The movement of objects through the air fascinates him.

Glenn, who is also very energetic, thoroughly enjoys going up and down the climbing frame. He will sometimes wear a cape and leap off the top, pretending to be a superhero. His ability to move and the speed at which he does so are of enormous interest to him.

Learning Although both boys are building on their understanding of



height and speed, the actual ideas that interest them are different. Whereas Joseph is developing an understanding of up and down, on and off, and opposites, Glenn is learning more about distance, speed and height.

Support Practitioners should plan opportunities for the children to:

- explore movement, indoors and out
- move over, under, across and through things
- explore different equipment eg bikes, Frisbees, skates, balls of various sizes and climbing frames

Rotation

Examples Kai and Thomas, aged 11 months and 40 months, respectively, are fascinated by things that rotate. Kai will repeatedly and deliberately

reach for any round objects placed near him. He will feel, spin, bounce and turn things over. He also loves to throw and roll balls. Kai has even been observed throwing a balloon up in the air, then adding a spin to his throw to make the balloon land behind him!

Similarly, Thomas spends a lot of his time playing with wheeled toys. He enjoys playing with balls and spinning tops and he is often observed spinning himself around. Thomas also spends significant time outside with friends, playing games that involve spinning on their bikes, and constructing circular tracks, which they repeatedly ride around.

Learning Kai’s early experiences show how well he is beginning to understand rotation – an important concept that helps children to develop an understanding of movement, shape, space and spatial awareness.

Support Practitioners should plan opportunities for young children to:

- play with everyday round household items eg plastic bottles with lids, clocks and cup cakes
- mix materials together

The fact that Thomas can turn his bike and wheels so he is now able to control his spins shows a deep knowledge and understanding of rotation. Practitioners should respond by:

- talking to him about the shapes in the environment and counting them
- comparing circles with other shapes and discussing their differences
- playing ball or shape games, for example, ‘I spy a shape with no edges/four sides/etc.’

Enveloping and containing

Examples Oliver (nine months) is interested in searching for objects that have been hidden or covered up. He is often observed looking for things that are hidden exactly where he found them the last time. He likes wearing hats and loves games of ‘peek-a-boo’. Engaged in the enveloping schema, he is completely fascinated by the concept of ‘object permanence’, where a child learns that just because they cannot see an object, it does not mean that it is no longer there.

Erica, 47 months, enjoys building dens, wrapping things up, dressing up in layers of clothing, filling up bags and containers, and digging for worms and treasure in the garden.

Learning While both Oliver and Erica are pursuing ideas around hiding and concealing, their individual lines of

inquiry are different. Oliver is developing his understanding of ‘object permanence’ – a significant milestone in child development because it is linked to children’s developing cognitive structures. Oliver can remember objects even when they are out of sight and is able to demonstrate his thinking as he begins to make predictions about where things are hidden.

Erica shows that she is developing a conceptual understanding about space and size. As she fills her bags and sees which bag has more objects and which bag has less, she is exploring ideas around calculating and developing her conceptual knowledge about volume and capacity.

Support Practitioners provide opportunities for the children to:

- play hide and seek
- wrap up dolls in blankets/nappies
- play with bags and containers of varying sizes
- dig for worms or treasure
- play with hats, scarves, old clothes

Practitioners should also model words and phrases such as ‘hiding’, ‘disappeared’ and ‘invisible’, to help Erica express herself appropriately.

Transporting

Examples Eighteen-month-old Ella and 42-month-old Jade are both fascinated with moving objects – and themselves – from place to place. Ella enjoys carrying objects about in her hands or containers and pushing empty buggies around. As she fills and empties her containers, she is



A deeper conceptual understanding of space, place and quantity comes through transporting

developing a conceptual understanding about quantity and number. She is also learning different things about places and locations.

Jade spends a lot of time moving all the kitchen utensils and furniture in the role-play area to the garden. As she learns better ways to move objects from one place to another, she becomes more developed in imaginative play and understands more about creating new spaces.

Learning Despite the obvious similarities in the play of Ella and Jade, their individual interest in transporting differs. Ella is learning about direction, size, shape and space as she tries to push her buggy through narrow spaces. Jade, however, is developing a deeper conceptual understanding about space, place and quantity.

Support Practitioners should plan opportunities for the children to:

- use such language as ‘how far?’ or ‘turn right/towards’ etc
- talk about location, building and the different modes of transport
- explore living things and create a scrapbook of children’s learning
- transport bags, baskets and small objects around the setting.

Connection

Examples Charlotte and Michael, aged 48 and 58 months respectively, are both fascinated by things that they can connect. Charlotte spends her free time making things to pull toys along with. She likes to use string, Sellotape, masking tape and the stapler to help her to connect different objects and materials.

Michael is outdoors regularly, seen transporting guttering, planks and tubes that he connects with string or elastic bands. He also often constructs elaborate pulley systems. Water is an important feature and he frequently positions his structures some distance from the tap and travels ▶



Children learn important problem-solving skills through connection schemas

EYFS BEST PRACTICE

back and forth, fetching the water for experimentation and construction. *Learning* Charlotte and Michael are learning important problem-solving skills as they explore their interests in connection. Charlotte is consolidating her understanding in designing and making things, cause and effect, and how to manage tools effectively. This is important to the process of learning as it reveals that both children understand the consequences and the effect of attaching or connecting string or tape to their playthings.

Michael has a high level of understanding of how to link the tubes together, and his experimentations show the cluster of schemas evident in his play – trajectory, transporting and connection. They are both at the functional dependency level ie interested in cause and effect.

Support should plan opportunities for the children to:

- solve problems for themselves, using their connecting skills in different contexts
- recognise problems, preserve, try new solutions and think logically.

Enclosing

Examples Nicholas, aged 39 months, and Samuel, aged 55 months, both love to surround themselves. Nicholas is intrigued by constructing circular enclosures around himself. He enjoys

playing with the trains and can often be observed on the inside of his train track, rotating his body as he moves his trains round the track. Recently, he has begun to put objects and figurines into the carriages of the trains.

Contrastingly, Samuel is often busy building square or rectangular enclosures with wooden blocks. His structures are always balanced and



Enclosing schema: children love to surround themselves with blocks

symmetrical, and he manipulates the blocks so that everything is fenced in, filling the space inside his enclosure with more blocks.

Learning Nicholas is bringing together into his play, in a co-ordinated way, all his experiences and understanding about rotation, connection and enclosures, as well as his knowledge and understanding of transporting.



Transforming schema: children explore purpose and change

Because Nicholas is at a functional dependency level – understanding cause and effect – it is these kinds of schema co-ordination that Athey (1990) refers to as being 'higher-level and more powerful schemas'.

Samuel deploys a cluster of schemas in a co-ordinated way. In his play, he applies his understanding about the trajectory, containing and enclosing schemas. All of the early experiences he has had with trajectory, for example, building towers, rows and bridges, have ultimately enabled him to build symmetrically and fill in his structures. This behaviour shows that Samuel is learning about concepts that relate to size, space, pattern, symmetry and calculation.

Support Practitioners should plan opportunities for the children to:

- play with boxes, old sheets or other materials that children can change to suit their own purpose
- talk about size and dimension and let children explore different measuring tools

Transforming

Examples Ami, who is 14 months, and Sarah, who is 19 months, are both fascinated by how things change. Ami particularly enjoys playing with corn-flour and play dough. She will play with these materials for long periods, concentrating as she moulds it, hammers it into different shapes, or rolls it (by hand or with the rolling pin).

Sarah, on the other hand, is totally captivated by mixing paint. She is often seen at the easel – not painting, just mixing different colours together. She also likes playing in the sand. She enjoys filling different-sized moulds with equal amounts of dry sand. She will then carefully pour amounts of water into the mould, mix it with the sand, turn it over and knock the mould down. At this point, she will start the whole process again.

Learning Whereas Ami is learning about how she can transform things completely by altering their appearance and purpose, Sarah is focused on drawing comparisons between



Positioning schema: typical behaviour is lining up objects

PLANNING FOR SCHEMAS

When practitioners observe repeated patterns of behaviour in young children's play and exploration, they can use this information to identify what ideas children are pursuing.

The EYFS card, *Play and Exploration 4.1*, states that: 'Children's play reflects their wide-ranging and varied interests and preoccupations. In their play, children learn at their highest level. Play with peers is important for children's development.' Practitioners therefore need to understand and engage with the concepts that children are already interested in if they are to support their development and learning effectively.

Children's individual needs should be frequently

observed and catered for in all six areas of learning. The EYFS (2007, p12) reminds practitioners that it is their daily, ongoing observations of children's interests that will significantly inform both planning and provision: 'No plan written weeks in advance can include a child's interest in transporting small objects in a favourite blue bucket.' So, if practitioners are to plan and build on child-initiated activities that will extend a child's knowledge, skills and conceptual understanding in a meaningful way, they have got to be aware of the child's schematic interests.

In the context of a play-based framework, a sound knowledge of schemas can

be used to build on child-initiated activities. 'Children learn best through physical and mental challenges. Active learning involves other people, objects, ideas and events that engage and involve children for sustained periods.' (EYFS card, *Active Learning 4.2*). It is often through child-initiated activities that children display their real areas of interest. A practitioner's effort to build on these areas of interest gives children the time necessary to explore possibilities and similarities of abstract concepts, before they are able to assimilate new knowledge into their cognitive structures. And, a concept that is familiar enough will certainly be actively applied during play.

The adult role in supporting learning and development

The practitioner's role is to create a learning environment that is rich in resources and materials, and purposefully supports the development of concepts, by constructively engaging with children – effectively scaffolding and extending their learning.

'Provide materials that support particular schemas, for example, things to throw, for a child who is exploring trajectory' (EYFS 2007, p79).

By adhering to such guidance, practitioners will be able to maintain their continuing focus on the developmental interests and needs of The Unique Child.



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different shapes and sizes. This is important to learning, because children are finding out how to change the form of something and give it a different meaning.

Support Practitioners should plan opportunities for the children to:

- talk about quantity, weight, texture and how materials behave
- cook and bake
- collect natural materials to make a collage or board games.

Positioning

Examples Twenty-four-month-old Rebecca and 55-month-old Linda are interested in sequencing, classification and position. Rebecca likes to place her toys in rows. She will arrange her playthings in order of size; from the shortest to the tallest, for example. She also likes to draw small groups of similar objects in rows. Rebecca is fascinated by the size, shape and the position of things.

Straight lines also fascinate Linda, who is consolidating her understanding of the relationships pertaining to size and quantity. She is frequently seen in the creative workshop area arranging gemstones and silver buttons, alternately, in a pattern around the edge of her paper.

Learning Although the girls are both exploring the positioning schema, their individual pursuits are different. Rebecca's focus is on rows, with straight, vertical lines – her arrangement highlighting the particular size or group of the object. Linda is developing a deep understanding of sorting and classifying as she explores gemstones according to their shape and size.

This process allows children through repetition to build up their understanding and to learn basic mathematical concepts in a practical and meaningful way.

Support Practitioners should plan opportunities for the children to:

- explore colour, size, shape pattern and sequencing
- order and sort everyday objects
- use positional language, for example, in front, on top, behind or around the edge
- talk about their ideas and help children to think of new ones.

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