Nursery World Article

Introduction

Remarkable capabilities are divulged in the most conspicuous ways as children play. This can lead the devoted and discerning observer into a deeper understanding of the intricate nature of young children's thinking. In what they do, the language they use and the things they make as they play, children acquaint us with important aspects of their learning and development. Through careful observation, underlying patterns in thinking can emerge as children work on their schemas. With this in mind, the imperative for adults working with young children to sustain and nurture these *forms of thought* becomes ever more apparent.

What are Schemas?

There are many different definitions of schema which reflect the details and perspectives involved. Donaldson (2006, p.134) characterised schemas as 'organised behaviour patterns which Bartlett described in his earlier work as 'active, developing patterns' and Flavell (1963) noted as behaviours with an underlying sameness. Schemas therefore, may be defined as reiterating patterns which underlie children's unprompted behaviours, or as Nutbrown (2011, p.15) explained, 'repeatable patterns of behaviour, speech, representation and thought'. It is the work of Athey (2007, p.5) however, which identified several patterns of behaviour consistent with their particular features. She clarified schemas as 'patterns of behaviour and thinking in children that exist underneath the surface features of various contents, contexts and specific experiences' and named specific dynamic schemas emerging from action as follows:

- Dynamic vertical
- Dynamic back and forth
- Dynamic circular
- Going over and under
- Going round a boundary
- Going through a boundary
- Containing and enveloping space

Schemas or patterns of behaviour are perceptible indications of children's conceptual concerns. They are discernible insights into children's minds and are shaped by content and company. Dynamic thought patterns are distinguishable in action with figural or static representation linked with emerging perception, visible in children's drawings, model making, constructions and clay.

Schemas and Stages

Athey (2007) and Meade and Cubey (2008) document the developmental aspect of schemas with Athey noting a continuity and progression from motor behaviour, through symbolic representations to thought. In previous work, Meltzoff and Moore (1998, p.229) suggested that the 'initial mental structures' which infants possess, 'serve as "discovery procedures" for developing more comprehensive and flexible concepts' echoing Piaget (1950) and Bruner's (1966) work which highlighted the importance of early action as foundational for later representations when actions become capable of being internalised. Athey (2007, p.49) described the development of symbolic representation from these early motor and perceptual behaviours and identified advances in young children's thinking. In her observations of children's schemas, she noted 'the largest number of motor-level examples occurred at 3 years 1 month; symbolic representation at 4 years 1 month; and thought level at 4 years 5 months' (Athey, 1990, p.69).

Dynamic Vertical Schema: Jack's Story

The observations here of Jack were made from when he was 3 years, 11 months (3.11) to 4 years, 5 months (4.5) and reveal his prevailing form of thought, his dynamic vertical schema. He can also be seen co-ordinating schemas and exploring functional dependency relationships (cause and effect) in his symbolic representations. Jack was also observed thinking about his dynamic vertical schema entirely in the abstract. The observations tell another story, that of the holistic thinking of a young child revealed as he played, as he absorbed himself in important

personal investigations. Athey (2007) observed the repetitive nature of trajectory behaviours and clarified that motor level examples of dynamic vertical trajectory behaviour, show continuity in being precursors to symbolic representations which in turn anticipate later co-ordinations of schemas and abstract thought.

Dynamic Vertical Schema: Motor Level

Climbing up

Standing on top

Sitting on top of the train

Jumping down

Banging the hammer up and down

Extending guttering

Jack explored verticality with his own body and with a variety of things around him. He climbed up and down the rope frame, scrambled up on top of the tunnel and sat down on top of the train. He was fascinated with the tools and preferred not to rotate the screwdriver in a horizontal position, instead, upended it to use vertically so that he could strike it with the hammer. He spent a lot of time clambering up on top of objects and jumping down in his continuing acquisition of trajectory motor experiences. He joined two pieces of guttering together to make a longer channel then put the boats in and watched them sail down the long length of the

waterway, into the tub below. It was not the splashing, pouring, dripping or measuring potential of the water trough and contents which appeared to captivate, but the movement of the boats as they drained slowly into the container beneath.

He discriminated the possibilities of contrasting environmental content and used the things around him in a precise way. In clambering up, jumping down, screwdriver hit, extending gutters, all represented his prevailing form of thought as he furthered his understanding of vertical trajectory movement.

Dynamic Vertical Schema: Thought Level

Piaget (1959) maintained that thought proceeded from action which Athey (2007) upheld in confirming that ‘a schema is 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’. The observation described here reveals both continuity and progression. Jack’s form of thinking, his schema, threads through the observation, with progression evident in co-ordinations of schemas and actions which have become internalised. A diversity of experience is brought forward in an imaginary context, with Jack (4.5) now able to evoke and predict in imagination with ideas represented in thought alone.

A big, high fence

Jack (4.5) had been busily occupied with the blocks and went on to discuss his work with an adult. A set of ideas which he had been exploring beforehand became clear. Jack presented an opportunity, an invitation to come to know him better. He attempted to lead the listener towards a more insightful comprehension of his conceptual understanding, articulated in a coherent and expressive narrative...

“I built a high fence so Harriet couldn’t see us (she was occupied on the other side of the ‘fence’). “I smashed the top down then knocked down the middle bit quickly. I got the big, big tall ladders climbed right to the roof’. I ran home and got some sticky tape and put it all round the building and barrier signs to keep the monsters out. I made a tight-rope out of big planks it went from there to there”.

Concept	**What Jack did, said...**	**An interpretation...**
Position	“I built a high fence so Harriet couldn’t see us”	There is a migration in Jack’s thinking as he refers to a point of view relative to his own. He could imagine Harriet’s perspective in that the high fence would prohibit her view of him. Harriet’s inhibited view is functionally dependent on the height of the fence.
Force	“smashed down” “knocked down”	An apparent incremental notion of force is now able to be imagined rather than tested.
Estimation	“big, big tall ladders, climbed right to the roof” “a tight-rope out of big planks it went from there to there”	In order to be able to reach right to the top of the building, to the roof no less, tall ladders would be needed. Short ones would not be suitable. He is exploring space relations and distance in an estimation expressed verbally. He co-ordinates the distance between objects in identifying a gap which needs bridging. He expresses a calculation and approximates that only planks of an

		appropriate length would do.
Equivalence	"I ran home and got some sticky tape and put it all round the building"	Leading on from back and forth sensori-motor activity, there is a co-ordination at thought level of the distance from *a* to *b* and *b* to *a* (the fence and home) with an arrival at equivalence.
Trajectory	'I ran home and got some sticky tape...' '...and put it all round the building and barrier signs to keep the monsters out'	The purpose of trajectory is described: the necessary acquisition of sticky tape from another distant location. The securing of the building was functionally dependent on the sticky tape going around it and barriers in front, to offset invasion.
Seriation	'I smashed the top down then knocked down the middle'	Jack describes a chronological event which he may previously have experienced in action but is now able to imagine. He articulates order.
Height	"high fence"	An expression of absolute size and not comparative expressed in action in his selection of matching blocks, upended for maximum height.

Nutbrown (2011) explained the significance of connections in learning marking progression, where co-ordinations of schemas evolve into higher – order concepts. Jack had been working on his dynamic vertical schema at a motor and symbolic level but as he got older, had begun to represent his prevailing, dominant schema in the abstract. Within the 'big high fence' observation, evidence of co-ordinated action schemas is apparent. Also, several areas of learning and development, described in the Early Years Foundation Stage Profile Handbook (DfE 2013) are revealed in Jack's actions, in the language he uses and in the specific content to which he refers. This complements the schematic view of his thinking and enhances our understanding of him.

About schemas...

Dynamic Vertical

- upending blocks
- big high fence
- smashed the top down
- knocked down
- big, tall ladders
- roof
- climbed

Dynamic Back and Forth

- tight rope
- there to there
- ran home

Going Round a Boundary

- sticky tape all round the building

Containing and Enveloping

- monsters out
- middle bit

About Prime Areas of Learning…

Communication and Language

- Children express themselves effectively
- They develop their own narratives and explanations by connecting ideas or events
  (DfE 2013: 24)

Physical Development

- Children show good control and coordination inlarge and small movements.
- They move confidently in a range of ways
- They handle equipment and tools effectively
  (DfE 2013: 25)

Personal, Social and Emotional Development

- Children are confident to try new activities,
- They will talk about their ideas, and will choose the resources they need for their chosen activities
  (DfE 2013:26)

About Specific Areas of Learning…

Mathematics

- Children solve problems
- Children use everyday language to talk about size, position, distance to solve problems.
- They explore characteristics of everyday objects and shapes and use mathematical language to describe them
  (DfE 2013:28)

Understanding the World

- Children talk about past and present events in their own lives and in the lives of family members.
- Children know about similarities and differences in relation to places, objects, materials and living things.
- They talk about the features of their own immediate environment and how environments might vary from one to another.
  (DfE 2013:29)

Expressive Arts and Design

- They safely use and explore a variety of materials, tools and techniques
- They experiment with design and function
- Children use what they have learnt about media and materials in original ways, thinking about uses and purposes

- They represent their own ideas, thoughts and feelings through design and technology, role play and stories (DfE 2013:30)

Supporting children as they work on their schemas

The chance of encountering adults who care tenderly, treat fairly, watch carefully, listen acutely, respond sensitively, support gently, yet can provoke affectionately, is surely welcome company for children in learning environments. To notice what is important to the child as they go about their work, what is of particular interest to them is not just about the things they choose to play with, the items in the environment to which they are drawn, but the way in which objects are used. An awareness of patterns and consistencies in the things children do, make and say is important, for if adults are mindful of, and receptive, to children's cognitive structures, their schemas, the time spent together can be a more attuned and conceptually relevant encounter.

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