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Scheme or Schema: A Tribute to Athey's Froebelian Genius!

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If you work within early childhood education, you may have come across the concept of schematic play. In this article John Siraj-Blatchford and Tamsin Grimmer discuss and explain the use of the terms scheme and schema.

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What's in a name?

Tamsin has been using the term 'schema' to describe the repetitive patterns observed in children's play (Grimmer, 2017), and John, together with Lynnette Brock (Brock & Siraj-Blatchford, 2019), have described the same actions (of containment, positioning, trajectories etc.) as 'schemes'. So which term should we use, from where did these different terms originate, and does it matter?

These schematic action patterns or operations were first described by Piaget, who referred to them as 'schemes', and it has only been in the English-speaking world and through mistranslation that they have come to be known as 'schema'. In applying the word 'schema' to 'schemes' in her foundational work in the 1970s, Chris Athey was simply following the practice of virtually every other British and US scholar. In fact, the alternative terminology wouldn't matter at all today except that there is now a greater interest and reason for discriminating between what Piaget referred to as schemes and schema, and in the academic process of citing his original writings on the subject we now need to correct the mistranslation. Piaget (1969) states: 'In our usage the terms schème and schéma correspond to quite distinct realities, the one operative (a schème of action in the sense of instrument of generalisation) and the other

figural (figurative or topographical schema)' (p.ix). And as Hans Furth (1969) noted: 'English versions of Piaget's books do not consistently translate the French word scheme, although most commonly it is translated as schema, so that the above distinction could not be easily articulated' (1969, p.102).

Athey was aware of the distinction between scheme and schema as she spoke in terms of operative and figurative thinking, and she wrote that: 'Piaget makes it clear that "schemes" refer to "real" operational systems of knowledge and "schemas" refer to mere "figurative" knowledge (Athey, 1990, p.114). Despite her knowledge of the distinction, Athey chose to continue to use one term,' schema' in her work, as she explained: 'However, because of the exploratory nature of the Froebel project and the difficulty of differentiating between observations of "scheme" and "schema", we will continue to use the word "schema"' (Athey, 2007, p.114). She believed that this distinction was 'worthy of further study' which is what SchemaPlay has been doing (Brock & Siraj-Blatchford, 2019).

Historical background

It has certainly been the schemes, the repeated actions or operations observed in children's play, that have been of most interest to early childhood educators. Athey provided the first systematic study of them, although many practitioners will have observed them for decades. It is only in recent years that educational science has begun to catch up. This bottom-up process in the development of our scientific understanding is a common one and a very good example of this is provided in the story of vaccination. Apparently, it was Edward Jenner (a Gloucestershire GP) who first heard about local milk maids smearing cow pox on their children, to protect them from smallpox, and he decided to study the practice further. Jenner systematically tested the 'folk remedy' and found that contact with CowPox did indeed provide some protection from Smallpox, and he announced the discovery of 'vaccination' in 1796. Louis Pasteur acknowledged his debt to Jenner when he later produced vaccines for cholera and anthrax in animals, and in 1885 in successfully treating a nine-year-old boy with rabies. Science often proceeds in this way and Athey's groundbreaking research contribution may now be considered as equivalent to that of Jenner, as researchers and early childhood educators continue to elaborate the theory and practice of schemes and schema in the future.

Emotional scaffolding

SchemaPlay practice has both cognitive and affective relevance in early education. Readers will be familiar with Jerome Bruner's idea of 'scaffolding' whereby an adult is able to provide support to the child in learning by taking on some of the cognitive challenge. 'Emotional Scaffolding' (John-Steiner, 2000, p.19) refers to the ways in which we can also provide affective support and is a helpful way of describing the role of the adult in relation to children's emotional development. The challenge for adults in relation to schematic play and pedagogy is to consider both the cognitive and affective aspects. Cath Arnold considers both in her book, Understanding Schemas and Emotion, where she talks about her grandson, Harry, who was really into connecting everything with string. She had studied his interest in connection, without looking at it through an emotional lens initially, then when she later reflected upon this phase in his life, she noticed that there was a link between his strong desire to connect and his emotional world. Harry's parents had separated and he was trying to connect everything else together! Cath realised that there was often an emotional significance to schematic play. She states, 'cognition in action can assist young children in processing and coming to understand very real emotional events in their lives' (Arnold, 2010, p. 3).

The difference between a scheme and a schema
Every 'golden nugget' of knowledge that we learn has two dimensions – a figurative schema and an operative scheme. Take a look at this image – what do you think this object is?

What do you need to know in order to learn about things?
To understand or learn about something you need more than just an image or even the name for it, you also need to know what it does and how you use it (what its 'affordances' are). These distinct figurative and operative dimensions apply to our learning of all areas of knowledge and understanding.

The image above is of some 'Escargot Tongs' – a utensil that is used to hold a snail shell firmly while you are extracting the snail to eat it…
The figurative schema is provided by what this object looks like and its name, and the schemes are the different ways we could use the artefact – the operational actions and affordances that it offers.

One of the things early childhood educators usually have in common is their desire to listen to young children and respond sensitively to them. When we work with children daily, we tune into them, follow their interests and observe closely what they do, how they do it and what they say. This then informs our interactions and how we plan and resource their learning environment. Scaffolding supports the child's learning and development and simultaneously contributes to their emotional wellbeing and empowerment.

Schematic learning
As we explore and learn about the world around us using our senses, we progressively build, and reorganise, a personal cognitive structural framework, an image if you like, of how the world works. Piaget referred to these mental structures as being made up of schemes and schemas and he believed that, in their natural learning through play, young children repeatedly apply their action schemes to new figurative schema contexts, and that by doing so they build upon their knowledge.

It may be helpful to share a case study to help illustrate this distinction.

Does it matter which term we use in practice?

The short answer is in day-to-day practice no, not at all. In practice it doesn't matter which term you use, the most important thing is to follow the child and support them during play. Offering children invitations to play and resources within the environment that allow children opportunities for schematic play is really important, regardless of the language used. Writing and talking about 'schematic play', and applying the practices that have been promoted as 'schema pedagogy' in the past has been totally legitimate and acceptable. However, Athey acknowledged that more thought should be given to these terms and perhaps for future more advanced practical implementation of Piaget's principles, it will be helpful to distinguish schemes and schema. Therefore academically, and in developing our understandings further it does matter.

Conclusions

The word 'schema' refers to figurative thinking and describes the mental images and words that represent material and symbolic objects, whereas the word 'scheme' is referring to the operations or actions associated with the schema. In their repetitive use of schemes in multiple schema contexts the child builds upon their overall knowledge of action possibilities. When a child repeats their schemes, for example through filling and emptying containers like Isla, they are not only containing but they are also finding out how fillable different containers are, they are learning about the possibilities of what they can do with these containers.

Athey's considerable research contribution, by systematically studying children's schematic play, is considered as pivotal and as many current researchers and early childhood educators continue to elaborate the theory and practice of schemes and schema they are truly standing on her shoulders.

Case study

Isla regularly climbed into boxes or containers and filled and emptied baskets and buckets in her play.

Through filling and emptying, Isla was learning about containment. She sometimes contained herself and sometimes contained objects. Isla does not yet have the abstract understanding of 'containers' but she can apply her emerging concept of containment in her actions as she puts things and herself into and out of containers and in her language as she talks about 'in' and 'out', 'empty' and 'full' etc. The actions come first and help to build her understanding as she learns about containing through these actions. When using the language of SchemaPlay, these actions are schemes and the figurative concept of containers is the schema. She was trying out her schemes in different contexts too, sometimes containing herself and sometimes containing objects. In this way she was adding schemas to her schemes, building the framework of knowledge based on her experiences. However, it is through the doing, through the actions, through the schemes, that the child learns. Our role, whatever language we use to describe the play, is to listen to these behaviours and cater for these actions.

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