The stories of four young children's schematic explorations within their lived experience

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Abstract

Recent UK Government policy means more and more two-year-old children will be entitlement to free places in a variety of funded settings in the future (DfE, 2013a). Understanding and knowledge of how two year old children's cognition develops continues to remains an under researched area. A key achievement of this thesis is its contribution to the understanding of how two-year-old children use schemas to construct knowledge from their lived experiences

This thesis contributes new knowledge through the detailed written and photographic illustrations, which portray how through day-to-day experiences four two-year-old children's schemas are constructed and co-ordinated. This thesis also identifies what kinds of environments and pedagogy can support two-year old children's schematic explorations and development. The thesis first reviews the literature highlighting the "preciousness" (Atherton, 2013: 6) of experiences children gain in their first few years of childhood. Followed by a critical examination of how recent research findings have intertwined to influence the evolving early years landscape.

Methodological and ethical issues are identified and discussed. The thesis presents four case studies written as narrative stories of the children's day-to-day experiences at nursery and home. Drawing mainly from the work of Atherton, (2013); Nutbrown (2011); Athey (2007) and the work of Piaget (91953, 1959) the stories are analysed to suggest a viable schematic interpretation of the possible developing cognitive patterns. The findings acknowledge and recognise supporting young children's schematic motivations provides children with the space to become social actors in their own learning.

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Chapter 1 Introduction

'We do not stand outside the lives of participants but see ourselves as part of the phenomenon under study'

(Clandinin, Murphy, Huber and Orr 2010:82)

I start this thesis with the words of Clandinin et al (2010) to highlight that this is not a only piece of research I have undertaken but a piece of research in which I am *involved.* I am looking to situate myself within the child's world as an adult collecting data from young children's everyday experiences; my presence within this research has to be acknowledged.

This chapter will provide an explanation of the rationale and context for the focus of this study, followed by an overview of the structure of the thesis.

1.1 My story, the rationale

Two interconnected interests underpin the rationale for this research: to gain a deeper understanding of two-year-old children's thinking and the government intention to provide educational funding for two-year-old children.

The first, my fascination and at times frustration, as I have attempted to gain a deeper understanding of the needs and thinking of two-year-old children. Initially qualifying as an early years teacher, I gained twelve years' experience, both as a classroom practitioner and senior manager within state maintained primary schools. In 2002, shortly after the birth of my second child, my husband and I moved from Manchester to Scarborough to take over the ownership and management of a 48 place private day nursery.

A vital and exciting role within my new career involved developing provision to ensure the nursery appearance attracted new customers, but more importantly met the needs of the children we cared for. Huge amounts of planning and research were involved, and this combined with my previous experience as a

nursery teacher and recent experience as a new mother, ensured the fruitful development of both the baby and the pre-school environments.

Conversely, over a period of years the two-year-old environment has undergone several re-developments, involving thousands of pounds and many hours of physical hard work before it seemed to 'work.' After several years of observing, reflecting and questioning, I re-designed the indoor and outdoor environment for the two-year-old children, around the concept of nourishing young children's schematic interests (Nutbrown, 2011). Athey (2007:5) defines schemas as "patterns of behaviour" interpreting young children's actions through a schematic lens afforded a greater understanding of the children's needs. As I spent time with the children I regularly observed them testing their hypothesis and understanding of the world around them. During this time I began to recognise their capability, resilience and cognition. I learnt to value the children as 'knowers' and 'constructors' of their own knowledge (Janzen 2008, and Malguzzi, 1998).

The second influencing factor comes from the government's intention, to provide further funding for two-year old children (DfE, 2013a) to attend educational settings, meaning that in the future *more* two-year-old children will be attending educational settings.

In the next few years, more and more two-year-old children will enter the doors of a variety of funded settings to take up their entitlement. More and more settings and practitioners will be expected to have both the skill set and knowledge to work with these children and their families. Yet, my personal experience over the last ten years has frequently demonstrated the difficulties staff and parents experience, when attempting to understand the actions and behaviours two-year-old children frequently demonstrate.

This thesis aimed to develop a deeper professional understanding of how two-year-old children's engagement with the environment supports their learning. Through adopting a schematic lens, the thesis attempts to gain a greater insight

into the lives of four two-year-old children. It is the intention that through this thesis, more light will be shed on the process of how learning occurs within a two-year-old child.

1.2 The questions and structure of the research

From my experiences of two-year-old children and their obvious schematic motivations, the following research study evolved:

The stories of four young children's schematic explorations within their lived experience.

The research questions underpinning this study are:

1 What does a two-year-old child's schema look like?
2 How do schemas support individual young children's thinking (cognitive development)?
3 Do schemas translate and transform across different boundaries within a young child's life?
4 How do social and cultural influences influence children's schemas?
5 To what extent does schematic behaviour contribute to young children becoming social actors in their own life?
6 What kind of environment and pedagogy can support children's schematic explorations and development?

The thesis is organised into a series of eight chapters:

Positioning children as "co-constructors of knowledge" (Janzen 2008:291)
Chapter 2 presents a critical review of the literature in relation to the thesis. Identifying the criticality of young children's social, emotional and physical experiences. The discussion recognises how through an understanding of schema adults are able to acknowledge children's capability to actively construct and develop an understanding from their lived experiences.
Recognising early education sits within a wider policy context the discussion aims to clarify recent policy developments. Exploring how through the intertwining of recent research findings and government policy the early years

landscape has evolved. Recognising "the earliest years in a child's life are absolutely critical (Tickell, 2011:2) the chapter unpicks the significance of social influences, the nuances of family life that mediate young children's development. Identifying the importance of collaborative relationships between practitioners and parents.

Research questions and methodology are presented, discussed and justified in Chapter 3, along with an overview of my positionality. This is followed by a justification of methods and methodology, describing the process of how the research developed and evolved, with an examination of the case study approach. The section provides an explanation of how the collected data is analysed and interpreted before being presented to the reader as four case studies. The chapter also examines some of the ethical issues associated with working with young children, together with an explanation of how the research data has been collected and analysed.

Observations and photographs with date of my research with Abby, Hannah, Emily and George are presented and interpreted in Chapters 4, 5, 6 & 7. Each case study is presented as a narrative, depicting how the children pursued their schematic endeavours across the boundaries of nursery and home. The stories are presented using a chronological time frame, to illustrate the children's emerging patterns of thoughts or their form of thinking (Nutbrown, 2011). Each account is preceded by a discussion and concludes with a reflective evaluation.

The thesis concludes with chapter 8 providing a summary of evidence for each research question. The thesis presents a rich set of narratives evidencing the experiences of four young children's lived experiences and demonstrating how the day-to-day experiences and endeavours of four young children build into conceptual knowledge, through revealing their schematic forms of thought (Nutbrown, 2011).

Over a period of 16 weeks, the four children's physical and conceptual actions corroborate the growth and translation of their schemas, affording greater

understanding and a "coming to know" (Atherton, 2013) of *how* two-year-old children learn.

Finally, the thesis identifies areas for further research:

- A longitudinal study, identifying how children's 'threads of thinking' (Nutbrown 2011) develop and fit within the expectations of current educational practices in maintained primary schools in England.

From a practitioner's perspective, how a working knowledge of schema supports:

- Building relationships with children and their families.
- Delivery of statutory elements of the Early Years Foundation Stage Curriculum (DfE, 2012) and National Curriculum (QCA, 1999).
- Ability to support the breadth of children's interests and learning.

The following chapter will recognise the experiences young children gain in their first few years of life form the foundations for their future justifying why "the earliest years in a child's life are absolutely critical" (Tickell 2011: 2).

CHAPTER 2
The process of 'coming to understand'

Recognising that "the earliest years in a child's life are absolutely critical" (Tickell, 2011: 2), and acknowledging the relationship between learning opportunities, environment and the role of the adult in young children's lives is paramount. The following section will highlight the criticality of experiences gained in the first few years of childhood and unpick how recent research findings have intertwined to influence the evolving early years landscape.

2.1 Young children as actors in their own learning

The intention of this section is not to provide an in-depth review of the development made within the first few years of life. Instead, the discussion will explore the "preciousness" (Atherton, 2013:6) and criticality of children's social and emotional development alongside the physical experiences gained in the first few years of life. Reflecting on how such an environment can be replicated for young children in day care settings. Believing as Janzen (2008: 292) describes that young children have "worthwhile and insightful understandings of the world around them," the discussion takes the premise of positioning the child as a "co-constructer of knowledge, identity and culture" (291).

The chapter will proceed to introduce the concept of schema through a discussion drawing primarily from the work of Athey (1990, 2007), as well as other researchers (Atherton, 2013; Nutbrown, 2011), who have continued to explore and advance the work of Piaget through their practical application of the schema theory. An aim within this study is to recognise how a schematic pedagogy supports and facilitates young children as "co-constructer of knowledge identity and culture" (Janzen, 2008:291). The discussion will portray how schematic behaviour contributes to young children becoming social actors in their own life. Concluding through the use of a schematic pedagogy, adults are able to acknowledge young children's capability to actively construct and develop their understanding and knowledge gained through lived experiences.

2.2 The criticality of early experiences

Fundamental to all children's development is the need to feel safe and emotionally secure within an environment (Gerhardt, 2004; Clare, 2012). In this context, emotional security is synonymous with attachment. Bowlby (1997:195) defines attachment as "seeking and maintaining proximity to another individual". Positive and close relationships are an essential part of human existence. Page, Clare and Nutbrown (2013: 34) acknowledge, "Close, intimate and trusting relationships are essential to the well being of every one of us," in the recent review *The Foundation Years: Preventing Poor Children Becoming Poor Adults. The report of the independent Review of Poverty and Life Chances* (Field, 2010:7) identifies what matters to young children is not money but loving and responsive parents who create a secure bond with their child. Hughes (2006) also suggests that, within a young child's life. The importance of love cannot be ignored:

> From a baby's point of view, if someone loves you and sees you as lovely, you feel lovely. If the closest adults are responsive, gentle and loving…he will trust that the world will give him what he needs. Without love, the baby becomes anxious and does not reach out. If the baby does not reach out, he does not touch the world and remains locked in his own world (Hughes, 2006:7).

Such security enables the development of relationships and, consequently, an attachment to develop between the child and parents (Bowlby, 1989).

Within the context of a full day care setting the importance of young children forming secure attachment cannot be underestimated Elfer, Goldschmied and Selleck (2012) concluded that, in the absence of parents, these children need the attachment of a special person. With in the context of this thesis such special persons are referred to through the term key person and key worker. Due to the long hours the setting opens a key worker system has been established. Comprising of a team of familiar adults who work in close partnership with the children. Fostering the development of attachments through nurturing affectionate reliable and close relationships. A key person is defined as a familiar adult whom a child has personally sought out to gain individual support from.

Clare (2012) describes how through providing a safe secure and nurturing environment day care settings can support children to form attachments and provides an example from a nursery setting, that encourages parents to take photographs "of the people/ things that are important to their child" (23) at home which they also do within the nursery. The photographs are collated into a special book and kept within the child's reach, strengthening Page et al. (2013) belief that learning for very young children is about "self and place and space and relationships" (25). The need for practitioners to understand the importance of attachment and a child's need to feel special is illustrated within this study, through Emily's relationship with her key worker. Emily's experience of feeling special resonates with Hughes (2006) and Trevathen's (2012) ideas of love. Whilst the effect of love may not be visible to the naked eye, Trevarthen (2012) notes that "the baby who was looking for intimate encounters and support at birth is much more implicated in culture and more aware of friendships, and ready to profit from an imaginative preschool"(6).

Whilst Emily's experiences in Chapter 6 recognise that when considering the learning process the importance of young children's emotional needs cannot be ignored or underestimated. The focus of this thesis is to gain a deeper understanding of the development of young children's conceptual thinking. Meaning the findings of this thesis will concentrate on illustrating the emergent patterns of young children's cognition and not their emotional needs.

Clarifying the links between experiences and cognitive development within young children, Field (2010) clearly acknowledges the importance of brain development in young children, identifying a direct relationship between the growth and development of the brain and the quality of experiences a young child gains. Gopnik, Meltzoff and Kuhl (1999) confirm that sensory play experiences support the connections made in the brain. As babies grasp and move their arms around, muscular strength develops down their arms, eventually reaching the fingertips. The positive sensory feedback from this play encourages the child to repeat it. "Such sensory motor experiences are

considered crucial for early development" (Corbetta and Snapp-Childs, 2009: 44). The repeated actions strengthen the neural pathways, signifying the "experience of being alive in the world grows from the sensation of body movement" (Trevarthen, 2012: 5).

Through his theory of "Forms of Intelligence", Gardner (1984:208) conveyed his understanding of the role of the body. He dismisses a "divorce between the mental and the physical" the assumption that motor activity is subservient to thought, instead promoting the view that what we do with our bodies is equal to the language and logic of the mind. Providing a foundation for Johnson's (1987) belief that from the embodied experiences of physically manipulating objects, bodily movement and perception learning can be shaped. A view shared and illustrated in this thesis through the individual stories of Abby, Hannah, Emily and George.

Building from Piaget's (1959) idea of thought as internalized action Greenland (2000) developed the idea of "body thinking" describing "mental thoughts that arrive by way of words or pictures and body thoughts that arrive by way of wiggles and jiggles" (8). This emphasises that it is only through recognising and listening to the direct perceptions that come through the body are we fully able to recognise how young children learn. Matthews (2010) also highlights the perception young children gain through "meaningless actions – twirling, running, jumping up and down, shouting, singing, apparently aimlessly messing around with objects" suggesting it can be linked with drawing and painting (3). He acknowledges, "action representation has rarely been described and its relationship to the development of drawing [and painting] is yet to be fully understood" (24). However, he states:

> The very notion that drawing might be merely physical is to this writer, wrong headed anyway. Painting, like any other activity, is multi modal, involving kinaesthetic, proprioceptor, and haptic, as well as visual information. The traditional division between what is considered sensorimotor and the mental activity is an artificial and meaningless one. (Mathews 2010. 19).

Accepting that young children will not be ready to learn if they do not feel safe, the above discussion realises that young children's learning results from the use of their entire body. In summary the discussion has attempted to highlight some of the current understandings between the role of bodily movement and cognitive learning. Through the detailed analysis of four young children's schematic endeavours this thesis aims further to clarify and exemplify these connections providing clear illustrations of how four two-year –old children use their embodied senses to develop and extend their thinking.

The following section introduces the theory of schema as a means to further understand and support young children's learning.

2.3 Meaningful experiences: Schema

Through her work with the Froebel Early Education Project (1973-1978), Athey (1990) made a major contribution to the knowledge and understanding of how young children learn. Having applied Piaget's theory of schema to children aged 2-5yrs, Athey had her findings written and published in "Extending Thought in Young Children: A Parent – Teacher Partnership." Athey's interpretation and categorisation of schema inspired a "conscious and articulated pedagogy" (Whalley, 2010: xii) providing a window through which the process and business of young children's learning can be viewed. This study builds from Athey's work providing a detailed account exploring and illustrating how four two-year-old children's patterns of cognition; their schema, develop over a period of 16 weeks.

Whilst the term schema is referred to within the "Development Matters in the Early Years Foundation Stage (EYFS) (Early Education, 2012), as a way to "encourage independence as young children explore particular patterns of movements" (23), Atherton (2013:8) considers "no single characterization is able to satisfy" the complexities and differing perspectives around the concept of schema, thus suggesting a more complex understanding is required.

In tracing the origins of schema, McVee, Dunsmore and Gavelek (2005) identified the opposing views of cognitive science and cognitive psychology. Cognitive

science simply considers schema as an information processing concept carried out by an individual, whilst cognitive psychology perceives this view as "an in-the-head proposition", advocating that "we think of them as patterns that extend beyond the knower into the social and cultural world" (McVee et al., 2005: 535). Recognising the relationship between 'in the head' learning and skill development through adjustments made as a result of the interpretation of messages from outside the body, Bartlet (1958) identified:

> Skilled performance must at all times submit to receptor control, and must be initiated and directed by the signals which the performer must pick up from his environment, in combination with other signals to his own body, which tell him about his own movements as he makes them (14).

This reinforces the view that schemas develop as a result of both the embodied and mediated experiences with the world implying schemas both shape and are shaped by experiences. This raises the discussion of how the experiences and environments young children inhabit impact on their cognitive development? How do social and cultural experiences influences child's schemas? A subject area that will be further explored and addressed within this thesis.

Piaget and Inhelder (1969) paid great attention to the links between sensory activity and learning, naming it the sensory-motor phase, emphasising the embodied and active nature of learning. This is supported by Athey's (2007) belief that the relationship between a child's motor actions and sensory feedback is central to the learning process. Atherton (2013) describes the "powerful discoveries" (97) made by Corbetta and Snapp-Child (2009) who clarify:

> "By seeing and touching objects, by bringing them to the mouth, and by manipulating them, infants can learn about their physical properties, they can remember their specific characteristics, and use this newly acquired knowledge to plan future actions" (44)

Atherton (2013) illustrates this through describing Annie's sensory and physical exploration of a basket and her possible thoughts "What is this and what can I do with it? If I turn it over I can see the bottom" (97).

Piaget (1953) and Furth (1969) demonstrate that schemas develop as a result of assimilation; the progression of the 'new' into the 'familiar' with the acceptance that, in order to increase cognitive structure, every scheme of assimilation must also be accommodated. Furth (1969) suggests humans build up working cognitive theories by repeating actions, thus assimilating and accommodating new information into current models of thought. Using the sucking action of a baby to illustrate this theory, he observed how the sucking behaviour varies according to the different object and materials explored. "There is a difference between the sucking that results in swallowing and other sucking" (Furth, 1969: 45). He suggests the baby actively incorporates new experiences into its existing cognitive structure, resulting in an adjustment or modification of the structure, meaning through the process of assimilation and accommodation, the cognitive structure – the schemas become more complex and learning can be observed. Recognising and furthering knowledge of how young children's learning occurs is a major aim within this thesis. The development of more complex learning is illustrated in Chapter 7, as George's prior experiences of 'trajectory' and 'containing' schemas appear to combine to support and facilitate his new interests in 'going through a boundary.'

Defining schema, Athey (2007) describes a "pattern of repeatable actions that lead behaviour and thinking in children that exists underneath the surface features of various contents, contexts and specific experiences" (5). Nutbrown (2011) asserts that it is from these early patterns of behaviour that the foundation of young children's learning can be observed and supported. Athey (2007) also recognised and acknowledged that the growth of schemas occur through the function of assimilation and accommodation. The findings from the Froebel Research Project (Athey, 2007) highlight the notion that children's lived experiences relate to different levels of functioning.

- 'Motor-level behaviour' is the stage at which a child simply performs actions with no significance attached.
- 'Symbolic functioning action' is supported by thoughts that allow symbolic representation. This involves the capacity to form mental

imagery. Children use one symbol to represent another, displayed by making marks, play and speech (Athey, 2007; Furth, 1969).

- 'Functional dependency' is the dependent relationship between effect and actions (Athey, 2007; Bruce, 2005).
- 'Thought level,' allows events to be discussed and described in the absence of a concrete reminder or abstract thought (Athey, 2007; Furth, 1969).

Nutbrown (2011) maintains that schemas "sensitise" children to specific "events and phenomena in the environment" (145). Such patterns in children's actions and behaviour can indicate common themes, "fascinations" (Meade & Cubey, 2008:3) or "consistent threads" (Nutbrown, 2011:13), thus facilitating children to determine and maintain their own intrinsic motivations through identifying elements within the environment that provide a match for such thought patterns. This resonates with Neisser's (1976:56) belief that "a schema is a pattern of action as well as a pattern for action." In relation to young children this suggests a schematic motivation positions young children as "co-constructors of knowledge " (Janzen, 2008:291). Who are intrinsically driven to find a match between their thoughts and the environment a concept that is repeatedly illustrated within the findings and analysis of this thesis.

Meade (1995) characterises schemas as:

> Pieces of thoughts… not like the pieces of a jigsaw, because they don't fit in only one place. Perhaps the best metaphor is …like pieces of Lego which can be fitted into lots of different structures. (2)

Athey (2007) refers to such "pieces of thought" as *forms of thoughts* (55). Nutbrown (2011) likens *form of thoughts* to having "persistent threads" (46) of thoughts. She explains that children have "persistent threads of action, representation, speech and thought" that they apply to a variety of activities in order to make connections with the '*content*'. Used in this way, *content* refers to aspects and objects within the environment. Children's differing experiences support cognitive constructions to develop through the "fitting of content to different schematic threads" (Nutbrown, 2011: 47).

> If a child is focussing on a particular schema related to roundness, we could say the child is working on a circular schema. The *form* is roundness and the *content* can be anything that extends this form: wheels, the London Eye, rotating machinery, rolling a ball, the spinning of the planets! (Nutbrown, 2011: 47)

Such threads or continuity of interests (Nutbrown, 2011) provide meaningful and significant opportunities for children to gain new ideas and a greater understanding of the world. Nutbrown (2011) stresses the importance of nourishing young children's *forms of thought* with worthwhile and interesting *content* to maintain children's own intrinsic and natural motivations for learning. Atherton (2013) describes how providing Henry with an environment that supported him to build "bigger, higher towers" (67) facilitated the "practical ground work to secure Henry's later conceptual thought" (67). Atherton (2013:71) considers such attuned intervention is a "professional duty for practitioners". Through the contribution to new knowledge an aim within this thesis is to further develop understanding of what a two-year-old child's schema looks like so enabling such attuned intervention to be part of every child's daily experience.

Athey (2007) confirms that children gain new ideas through assimilating experiences (content) to existing thoughts (form) suggesting that, through the process of assimilation and accommodation, *forms of thought* gradually co-ordinate leading "to higher levels and more powerful schemas" (50).

Through a process of systematic observation and analysis, Athey (2007) draws from the work of Piaget (1896-1980) and her observations in the Froebel Early Education Project (1973-1978) to label and describe "eight clearly distinguishable… action schemas" (115):

1. Dynamic vertical
2. Dynamic back and forth
3. Circular direction and rotation
4. Going over under or on top
5. Going round a boundary
6. Enveloping and containing
7. Going through a boundary
8. Thought

Illustrating Piaget and Inhelder's (1969) understanding of embodied learning and the links between sensory activities and learning, Athey (2007) explains that, at a motor level, children who pursue a 'containing and enveloping' schema exhibit such behaviour as placing objects into containers or entering spaces themselves. Nutbrown (2011:13) describes how "toddlers work hard, collecting a pile of objects into the lap of their carer". Motor level activity is further illustrated by Atherton's (2013) example of Henry's actions in "rolling soft play cylinder" (48) and "kicking objects along the floor" (49) as he demonstrates his 'dynamic back and forth' schema, whilst such examples reinforce the premise that young children's future symbolic representation occurs through the repetition of experimental actions at the motor level. The aim within this thesis is to provide detailed examples and illustrations of young children's emerging cognitive development resulting from their experiences at nursery and home.

2.4 Visual representation

Within this thesis identifying what a two-year-old child's schema looks like requires the acknowledgement that young children's thinking can be expressed through the process of mark making as well as action.

In relation to young children Piaget and Inhelder (1969: 64) consider drawings and pictures to represent the "conceptual attributes" the child is familiar with, rather than their concern for the " visual perspective", suggesting it is the *form of thought,* the schematic interest that the child is representing rather than the content, the object. Wood and Hall (2011) suggest symbolic representation, used as a way of transforming and illustrating every day experiences, demonstrates "children's agency – how they act in and on the world" (271). In her work with a young boy called Henry, Atherton (2013) also illustrates a relationship between Henry's dynamic action schemas and his subsequent mark making, advocating the link between *forms of thought* represented through mark making and drawing. In such situations, Matthews (2010) explains a possible tendency to

consider "representation as a *re* – presentation of a prior experience" rather than the "essentially dynamic, constructive act which shapes the experience itself" (24). He stresses the importance of young children creating visual representations because when children use a mark or action to represent something they are making "something stand for something else" (1).

> In actions they [children] can make with their own bodies, and in actions they can perform upon objects and media, but perhaps especially with drawing and painting media, children learn how to form representations. (Matthews, 2010. 1)

Whilst Matthews (2010) work draws no overt connections to schema he seems to imply that young children's mark making could represent their embodied threads of thought. This raises an idea that will be illustrated and explored in more detail within this thesis through identifying what a two-year-old child's schema looks like.

Matthews (2010) suggests that children's drawings follow an organised and meaningful continuum. A belief supported by Athey's (2007) work with the Froebel project, from the collection of over five thousand observations, twenty-four distinguishable marks were identified. These were further sub divided into "two criteria - straight *lines* and *curves"* (62). When analysing the marks and drawings Athey (2007) paid great attention to the *form of thinking* illustrated within the work. She explained " if a drawing was named 'wheel' at one time, followed by 'flower' it was because the child was representing those, and other objects" (66). This raises issues about the knowledge practitioners need if they are to successfully support young children's learning, an area of knowledge this thesis will contribute to.

Wood and Hall (2011) conclude, "Educators need deep understanding of children's play, and the processes that link play and drawing" (280), thus warning that within present educational and development discourse drawing can be positioned "as an emergent or pre writing skill" (269). Ring (2010) believes misconceptions about the role of mark making and drawing has had a detrimental effect on educational practices with young children. The use of

drawing and mark making has not been recognised as a tool to promote meaning making. Wood and Hall (2011) suggest that such a view has resulted from the "limited educational purposes of play and drawing in curriculum policies in England (280). It seems present educational discourse values writing more highly than drawing (Matthews, 2010; Ring, 2010 and Wood and Hall, 2011). Ring (2010) also identifies that within curriculum documents replacing the word drawing with mark making has further separated it from the spontaneous acts young children are involved in as they come to understand the world, thus appearing to portray the role of drawing "as servants to defined curriculum goals"(Wood and Hall, 2011: 280). This thesis will contest that view, instead illustrating how the use of such activities is a necessary requirement and foundation for young children's future learning.

Wood (2013) believes measuring and matching children's actions through a curriculum lens raises the discourse of play or work. It is recognised that children have different perceptions to play and work Howard, Bellin and Rees (2002:3) recognised the "play-work dichotomy", suggesting children's "specific mind-set" (10) alter depending on their interpretation of the activity. The importance of children perceiving an activity as play "allows the exploitation of children's natural propensity to play" (12). Such enhancing, intrinsic motivation, enthusiasm, willingness and engagement were seen in Henry where Atherton (2013) describes his continual exploration of dynamic vertical movements; reaching up, putting objects on different steps, climbing and crawling up steps, running, walking or sliding down the slide. She uses examples of Henry's vertical and horizontal lines (mark making) to illustrate possible links between Henry's physical activities and his painting, suggesting that they are symbolic representations of his continual actions, his schema that is represented figuratively with paint. This supports Matthews' (2010) belief that:

> Out of the seemingly chaotic actions of the infant, there is articulated a gestural language on which symbolization will be built. Without this language in place, no further learning is possible (36).

This raises the issue of curriculum content an issue that will be addressed within the following sections of this literature review.

The literature in this chapter has highlighted the complex nature of schema, yet Atherton (2013:10) asserts that schemas' real "significance is for practice." A recognition and understanding of schema provides an understanding of the importance, value and influence environments have on young children's learning. A schematic pedagogy allows adults to gain a deeper understanding of *how* young children learn. Knowledge of schema enables practitioners to tune into children's forms of thinking, to match language and resources to further support young children's thinking. Schema theory contributes to both the skills and knowledge practitioners require if they are to recognise young children's intrinsic motivation. To value the matches made between their thoughts and the environmental content as young children actively "co-construct their own knowledge" (Janzen 2008:292). Atherton (2013), Athey (2007) and Nutbrown (2011) all agree that it is only through recognising and understanding *forms of thinking* that practitioners will be more able to facilitate and support young children's schematic "learning encounters" (Atherton, 2013:10).

An established link between young children's cognitive development and schema raises the discussion of the role of play, learning and curriculum, the following sections will discuss how the early years landscape has been shaped through recent policy development.

2.5 Policy versus pedagogy

Recognising that early years education sits within a wider policy context, it is not the intention of this section to provide a detailed review of all policy initiatives. It has, however, been recognised (Pugh, 2010; Siraj-Blatchford and Manni, 2008 and Wood, 2013) that, within recent years, the early years landscape has been directly influenced as a result of the intertwining of recent research findings and government policies. Wood (2013: 45) claims recent "successive government policy" has resulted in the development of an early years curriculum pedagogy

approach based around prescription standards, goals and outcomes. The following discussion will explore the justification behind this statement.

Robert-Holmes (2012) identified political interest throughout the 1980s and 1990s, in education and curriculum focused solely on raising standards of school-aged children, through the introduction of the National Curriculum and national assessment. In the 1980s, the contributions of pre school children's prior learning experiences had not really been valued, and so children under school age were not considered compatible within this policy agenda.

Commencing in 1997, a longitudinal study funded by the DFE investigated "the effect of pre school education and care on children's development," known as The Effective Provision of Pre-school Education (EPPE) Project (Sylva, Melhuish, Sammons, Siraj-Blatchford, Taggart and Elliot, 2004: i). The project recruited and tracked 3,000 three-year-old children from 1997 – 2003, collecting various data. The research aimed to explore five questions:

1. What is the impact of pre-school on children's intellectual and social/behaviour development?
2. Are some pre-schools more effective than others in promoting children's development?
3. What are the characteristics of an effective pre-school setting?
4. What is the impact of the home and child history on children's development?
5. Do the effects of pre-school continue through Key Stage 1?

Siraj-Blatchford and Manni (2008) agree that the findings from the EPPE Project (Sylvia et al., 2004) have been 'extremely influential' (24) having a considerable impact on government policy initiatives.

Duffy (2010) identifies the introduction of the statutory Curriculum Guidance for the Foundation Stage (CGFS) (QCA) in 2000 as the beginning point of a fundamental shift within political interest and focus on the early years. Abbot and Langston (2006) believe that such policy development signalled the value and importance of the early years, not just within educational achievement in

England, but as a contributing factor to children's and young peoples' holistic and life-long achievement.

This marked a further political shift as the interest in the early years began widening from a single interest in raising standards to include an anti-poverty agenda. Described by Pugh (2010: 5) as 'two parallel forces', policy strategies realigned taking a new direction from a singular approach focusing on raising standards, to a more holistic approach focusing on wider aspects of young children's lives.

Findings from the EPPE project (Sylvia et al., 2004) identified and highlighted the important developmental benefits young children gain from participating in high quality pre-school education:

> Pre-school experience, compared to none, enhances all-round development in children… an earlier start (under age 3 years) is related to better intellectual development…Disadvantaged children benefit significantly from good quality pre-school experiences, especially where they are with a mixture of children from different social backgrounds (Sylva et al., 2004: pii)

In regards to policy development, the Government's desire to reduce poverty, coupled with the research findings from the EPPE project (Sylvia et al., 2004), proved to be an effective combination, signalling a further increase in policy and services for young children (Pugh, 2010; Robert-Holmes, 2012; Moss, 2010; Taggart, 2010).

Introduced in 2004, the *Every Child Matters* (ECM) (DfES, 2004) agenda emphasised the expectation that every child should have a chance to fulfil his or her potential. Intending to achieve this aim through reducing levels of education failure, the ECM agenda (DfES, 2004) was criticised by Athey (2007) and described as "a response to a crisis" (23). She believed the legislation was about reducing negatives through a policy aimed exclusively at a particular fraction of the population.

> The features that are being expressed by people in power are their hopes that the new legislations will reduce the numbers of children who experience education failure, engage in offending or suffer anti social behaviour, suffer from ill health, or become teenage parents (Athey, 2007:23)

Athey (2007:23) concluded that the policy was one of "positive discrimination in favour of (so called) deprived people in deprived neighbourhoods." Maintaining her belief for an alternative approach, Athey (2007: 23) continued to argue that policy focus needed to be about improving professionals' understanding of the process of how learning occurs. Moss (2010: 8) also cautions that, despite the ECM policy (DfES, 2004), attention on early years education remains "inadequate", suggesting its major role is still about "readiness for school," (academic achievement) and not the pedagogical approach of developing a deeper understanding of young children. Identifying the need to gain a greater understanding of *how* children learn as an area for further exploration, is an expressed aim of this thesis; presented in the form of four narratives consisting of a detailed schematic analysis and interpretation of *how* four two-year-old children's cognition emerges over a period of 16 weeks.

2.6 The early years landscape

Continuing the political convictions (DfES, 2004) to improve outcomes for young children, paved the way for the joining of education and care through the merging of the non-statutory Birth to Three Matters Guidance (DfES, 2002), Curriculum Guidance for the Foundation Stage (CGFS), (QCA, 2000) and the National Standards for Day Care (DfES, 2003).

Described by Robert-Holmes (2012:31) as "a play based and developmentally appropriate curriculum", the initial version of the Early Years Foundation Stage (EYFS) (DfES, 2007) was introduced in 2007, becoming statutory in September 2008. Siraj-Blatchford and Manni (2008) consider the EYFS framework as a possible way to deliver a 'broad and long term vision of an integrated approach to services' (33) for young children and their families, thus strengthening the vision of a 'multifaceted' 'top down' approach to change within early years, brought about through the 'implementation of EPPE informed practice' (33). In contrast, Rayna and Laevers (2011:169) argue as a result of the "relevance" and "insight" of recent research coming from the under 3s it is time "for a bottom-up movement where early years takes the lead". A belief that is both recognised and

illustrated within the findings of this thesis through the recognition of Emily and George's mathematical skills (chapter 6 & 7).

Considering the implementation of the EYFS (DfE, 2007) as further evidence of the Government's intention to reduce 'society's ills' (Athey, 2007: 23) through raising education standards, Athey (2007) again questioned the Government's intention and effort of trying to raise education standards, without developing teachers' understanding of the process of young children's learning. Arguably a fact identified by Tickell (2011) that in the two years since its conception "less than half of the children (44%) are still not considered to have reached a good level of development by the end of the year in which they turn 5."

Athey (2007) maintains the central aim of education must be 'cognitive improvement' (31). In foregrounding the role of cognition, she suggests that enough attention has not been paid to identifying *how* children learn:

> What is needed is more information on the patterns of cognition that children bring to the educational situation… Questions on the nature of 'learning', 'knowing,' 'understanding' and 'experience' are psychological and pedagogical rather than political, and are of central concern to teachers. They are also of interest to many parents during the years of child rearing (Athey, 2007: 28)

Troublingly, Clare (2012: 4) reports that she frequently observed practitioners who appear more "concerned with the care as opposed to the learning" requirements of very young children and babies by referring to young children habitually being placed in environments more suited to 3 and 4-year-olds, thus very young children were unable to gain either the sensory or movement experiences to appropriately support their development. Highlighting a need for greater understanding about what contributes as a suitable environments for young children, an aim within this thesis.

Historically, there have been many pioneers of early childhood education who understood the ways in which young children learn. Fredrich Frobel (1782-1852) and Johann Heinrich Pestalozzi (1746 – 1827) advocated a philosophy of education that was based on a return to nature and argued that any form of

instruction should be based on children's own experiences. Frobel embraced the active nature of learning. He believed play to be a method of releasing the child's inner nature.

Isaacs (1930) stressed the importance of providing meaningful, relevant and practical experiences in which the 'active pleasure' and 'eager curiosity' (17) become immersed and challenged within every young child's mind. She observed how young children's thoughts continually changed and developed, implying that a concrete understanding develops through solving actual problems. Isaacs (1930) understood that children learn through 'stimulation' and 'active enquiry' (17), thus understanding that children gain such experiences through play.
Yet, as David (1996) pointed out in the UK, we continue to underestimate and undermine both the power of play and the fact that young children can be responsible for leading their own learning:

> Perhaps the very idea that something so serious as learning about the world and how to live in it could be best achieved by being enjoyable, largely self directed and controlled by the learner, even when – especially when – that learner is a small child (David, 1996: 95)

Article 12 of the United Nations Convention on the Rights of the Child (UNCRC) (United Nations, 1989) has managed to redefine the status of children and young people by acknowledging the social, civil, economic and political rights of all children, affirming children's rights to a voice in decision-making, to have freedom of thought and the right to be heard in any judicial and administrative proceedings (Kellett, 2010; Percy-Smith & Thomas, 2010). Applied within the early years education landscape, Rosen (2010) translates this as seeing children as actors and active participants in their own learning process; a view she concluded from her research into children's perceptions of curriculums and a view echoed within the findings of this thesis.

2.7 The early years curriculum

Since its initial conception in 2007 the EYFS (DfE) has undergone changes; a review led by Dame Clare Tickell (2011) highlighted the important influence a child's home has on early development, and the importance of a well-qualified

early years workforce. Identifying successes within the original framework resulted due to its underlying philosophy "the four themes and principles, and in particular the emphasis on the concept of the unique child and play based approach" (9). Suggesting its success is due to its pedagogical approach of foregrounding child development, play and learning.

The most recent version of the EYFS (DfE, 2012: 2) continues to assert the notion that "every child deserves the best possible start in life and the support that enables them to fulfil their potential." However, the framework also outlines the standards providers must meet to "ensure children's school readiness" (2). This reignited the earlier concerns voiced by Athey (2007) and Moss (2010), signifying even in 2012 regardless of the wealth of research on improving attainment for young children. The main focus of the EYFS (DfE, 2012:2) remains on "readiness for school," (academic achievement) and not the pedagogical approach of developing a deeper understanding of young children's learning.

At the same time, the EYFS (DfE, 2012) appears to support a play-based approach to learning through the introduction of three key characteristics of learning:

> *Playing and exploring*- children investigate and experience things, and 'have a go'
> *Active learning*- children concentrate and keep on trying if they encounter difficulties, and enjoy achievements; and
> *Creating and thinking critically*- children have and develop their own ideas, make links between ideas, and develop strategies for doing things. (DfE, 2012:7)

The framework identifies that relevant skills and knowledge will be delivered through "planned, purposeful play" (DfE, 2012: 6), which somehow implies the adult will be responsible for instigating the play, suggesting once again that we should not trust young children when it comes to considering *wha*t they need to learn. Whilst Wallerstedt and Pramling (2011) question if the true value of play can be maintained within an educational measurement system, Wood (2013) suggests that when play is viewed in the context of a statutory curriculum "play becomes intrinsically bound with the contemporary politics of education,

because it is subject to regulation and managerial processes such as target setting" (48), thus reinforcing the contemporary confusion and tensions practitioner's experience regarding pedagogy and curriculum (DCFS, 2009 and Moyles, 2010). Practitioners feel that they have to justify play in relation to learning goals and outcomes rather than focusing on pedagogy; recognising individual child's learning.

2.8 The role of theory

Biesta (2009: 36) reports how recent policy attempting to raise standards in education has created much discussion about the "processes" of educational improvement. Within early years, this is illustrated in the attempt to raise quality through the introduction of statutory frameworks (DfES, 2004, 2007 and DfE, 2012). In response, many now (Athey, 2007; Biesta, 2009; Nutbrown, 2011 and Sylva et al., 2004) believe the focus needs to be directed on the issue of *what* and *how* such a process can be developed? Athey's (2007) opinions within this discussion are clear:

> Although there are exhortations from many people outside teaching for teaches to improve the quality of education they offer, there is an anomalous accompanying denigration of the role of educational theory (27)

A central aim within this thesis is to recognise and illustrate the theory of schema and as such foreground *how* young children learn.

A central finding of the EPPE (Sylva et al., 2004) research highlights the best outcomes for children are realised in settings that "viewed cognitive and social development as complementary" (Robert-Holmes, 2012:32), concluding that these settings provide a higher quality of provision, thus demonstrating a link between:

> Settings that have staff with higher qualifications, especially with a good proportion of trained teachers on the staff, show higher quality and their children make more progress and better social/behavioural gains (Sylva et al., 2004: 56).

Attempting to reveal practices that support effective developmental gains and progress, Sylva et al. (2004: vi) recognised the occurrence of adult-child verbal

interactions that occur "when two or more individuals work together in an intellectual way to solve a problem, clarify a concept, evaluate an activity, extend a narrative etc" described as "sustained shared thinking". Sylva et al. (2004) findings reveal, "significantly more sustained shared thinking episodes occur between staff and children" in excellent settings (56).

Suggesting the term "sustained shared thinking", Sylva et al. (2004: vi) work shares a strong resemblance with Vygotsky's (1986:187) work about the "zone of proximal development", a concept recognised as:

> The discrepancy between a child's actual mental age and the level he reaches in solving problems with assistance indicates his zone of proximal development (Vygotsky, 1986:187).

The cultural context is fundamental to Vygotsky's (1978: 46) work, which recognises the "use of tools and human speech" as "two fundamental cultural forms of behaviour that arise in infancy". Vygotsky's work added an additional dimension to Piaget's explanations of children's learning through underpinning the important and vital role of 'others' in helping children to learn.
Vygotsky (1978) believes that children learn through social interactions and involvement in a social context. What appears on the social plane is internalised and becomes part of a child's own thinking, suggesting, "what a child can do in co-operation today he can do alone tomorrow". Vygotsky (1986:188) considered "imitation as indispensable" whether "in learning to speak" or "school subjects" (188), recognising that in order "to imitate, it is necessary to posses the means of stepping from something one knows to something new" (187). Vygotsky's work identifies the need for a more proficient other in terms of young children and schema theory this thesis will highlight the importance and role of the adult within the learning environment.

This thesis will demonstrate how knowledge of schema theory supports practitioners to become "effective pedagogical leaders who understand the learning and development needs of young children" (Nutbrown, 2013:1) facilitating practitioners to understand, value and respect young children as "co-constructer of knowledge, identity and culture" (Janzen, 2008:291).

Nutbrown (2011) reminds practitioners and policy makers that the important issue when working with young children is not to focus on the "national policy of the day" (142) but on the "*process"* of learning. Policy makers must understand that access and attendance within a pre-school provision alone will not necessarily improve every child's development and future life chances. As Sylva, Melhuish, Sammons, Siraj-Blatchford and Taggart. (2008) Identified, it is only through experiences gained in a good quality setting, that children make gains. Clare (2012) questions "how far have we come in the last hundred years if we are still legislating to pull children out of poverty … and questioning the quality of provision that we are providing for babies and young children"(7)? An aim within this thesis is to provide practitioners with greater understanding and "more information on the patterns of cognition that children bring to educational situations" (Athey, 2007:28).

Whilst the intentions of the EYFS (DfE, 2012) have been applauded by some (Robert-Holmes, 2012 and Siraj-Blatchford et al., 2008), others (Athey, 2007; Moss 2010 and Nutbrown, 2011) consider improvement in children's achievements will only be gained through focusing on a pedagogical approach that enables practitioners to gain a greater understanding of how young children learn. The above discussion has argued that the early years landscape has developed through a policy agenda aimed at increasing standards and reducing poverty this thesis aims to address what Athey would consider an appropriate and theoretical pedagogical approach to support young children's learning.

Within the early years it is accepted (Page et al 2013; Clare 2012 and DfE, 2012) that parents are a child first educator. The following discussion will identify the important impact of children's home experiences and expose the role culture plays in regards to young children's development.

2.9 The cultural nuances of family life

Recent research by Tudge (2008) into children's lives in diverse society highlights the significance and importance of the role of culture, thus recognising the influential role of families and parents within children's home learning

environments. This section unpicks the significance of and influence family life plays in the development of young children's future achievements. Suggesting that it is only when parents and professionals work within a collaborative relationship, that children's true achievements will be both understood and acknowledged

Making a significant contribution to the study and understanding of cultural influences within young children's environments, Brooker (2010) and Penderi and Petrogiannis (2011) refer to the "developmental niche", suggesting it demonstrates the mediating and shaping role that culture plays in young children's development. Conceptualising the developmental niche, Harkness and Super (1992) identified three distinct interfaces.

- The physical and social environment (*referring to the family and the organisation of daily life).*
- Culturally regulated child-rearing practices (*relating to parental practices of child rearing involving both education and care).*
- The psychology (beliefs) of the individual caregivers (*the caregiver's goals and priorities for the children).*

Explaining parents discrete cultural traditions and socialisation practices fluidly translate across the interface providing:

> Material from which the child abstracts the social, affective and cognitive rules of the culture, much as the rules of grammar are abstracted from the regularities of the speech environment
> (Super and Harkness, 1986: 552)

Regularity and repetition of the "invisible criteria adopted" (Park and Kwon, 2009: 59) in parental practices within the child's micro-environment (the home) ensures the core messages are emphasised and repeated. In terms of this thesis Emily and Hannah's home experiences regularly expose them to opportunities to hear number names, meaning at only two years of age both children are observed competently counting and using number names within their play. Super and Harkness (2002) state, "it is through such cultural thematicity, we believe, that the environment works its most profound influence on

development" (271). Harkness, Super, Bermudez, Moscardino, Rha and Mavridis et al (2010) make no connection with Vygotsky's theory (1978); however, this would appear to provide evidence on how such experiences are both significant and influential within a child's development. Vygotsky (1978) states that:

> Every function in the child's cultural development appears twice: First on the social level and later on the individual level; first between people (intrapsychological) and then inside the child (intrapsychological). (Vygotsky, 1978:57)

Nutbrown (2011:164) insists that "if children's learning and development opportunities are to be maximized," professionals must recognise the important and influencing role that parents play within their child's development. Meaning if knowledge about schemas is shared with parents they will be better placed to understand and support their children's learning.

Synonymous to the term "funds of knowledge" used by Moll, Amanti and Gonzalez (1992:132) in describing households historically accumulated culturally developed bodies of knowledge. Harkness and Super (1992) refer to the implicit and embedded taken-for-granted ideas, motivations, beliefs and forms of behaviour, which parents display as "parental ethnotheories"(373). Pointing out parental ethnotheories and the developmental niche naturally foreground the qualities that are most valued and prized within the family. As the primary caregiver, parents play an important role in orchestrating children's experiences "directly through their beliefs and behaviours and indirectly through the network of relationships they develop within the family and wider society" (Penderi and Petrogiannis, 2011:33). "Children's competence in the culturally marked areas is accelerated, whereas development in other domains lags, if indeed it is even recognized" (Harkness and Super, 1992:389), thus children are most likely to acquire the skills and knowledge that are promoted by the parents' developmental niche. Whilst this provides an explanation within this thesis for Hannah and Emily's knowledge of number names it also highlights the need for practitioners to recognise the knowledge young children bring with them as they enter educational settings.

2.10 Collaborative relationships between educators and parents

*Supporting Families in the Foundation Stag*e (DfE, 2011a) continues the political commitment to provide all children with the best possible start in life by outlining future plans to put "parents and children at the heart of services" (2). The publication reveals further reforms including extending free early education to the most disadvantaged two year olds from September 2012 and implementing a new Early Years Foundation Stage with a greater focus on engagement with parents.

Springate, Atkinson, Staw, Lamont and Grayson (NFER, 2008) identify children born into the lower socioeconomic group are reported to have the greatest chance of poor outcomes. The social and economic circumstances a child is born into will have a strong determining factor on their future academic success, as well as physical health, emotional health, educational attainment, school attendance and employment opportunities. Recognising the relationship between socioeconomic status and cognitive development (Feinstein, 2003), Field (2010) reports a child's ability profile at three years of age will be highly predictive of their school entry profile.

Whilst recognising the "commitment to greater social equality", Pugh (2010:13) believes Government policy needs to go further as a reported three million children and young people are still believed to be living in poverty in the UK. Attempts to readdress such disadvantages prompted the introduction in 2004 of universal part-time pre-school education for 3 and 4 year old children (Sylva, Melhuish, Sammons, Siraj-Blatchford and Taggart, 2011 and Pugh, 2010). Based on further research evidence, from Allen (2011) and Tickell (2011) who identify clear links between the experiences a child gains in its first three years of life and their future life achievements together with Field (2010:7) who suggests "later interventions to help poorly performing children can be effective but, in general, the most effective and cost –effective way to help and support young families is in the earliest years of a child's life". It is reported (DfE, 2013a) that the Government set aside early intervention grants with a forecasted budget of £534 million in 2013-14 and £760 million in 2014-15 aimed at providing free child care for vulnerable 2 year-old children. Further findings from the EPPE project

(Sylva et al, 2004, 2008) continue to demonstrate that the impact gained from attendance at a pre school setting alone is not enough to raise the outcome levels for children from disadvantaged backgrounds (Sylva et al. 2011). Sylvia et al. (2011: 117) concludes children who benefitted from both high quality home learning environments and high quality pre-school experiences gained the "strongest positive long term effects".

Sylva et al. (2011:119) established two key "protective factors" that "boost the development of children" (119), and "militate against the risk for children associated with low socioeconomic status" (Pugh, 2010:7). The first being a secure, supportive and interested family and home learning environment together with experiences gained from the attendance of a high quality preschool. Acknowledging children's outcomes are a product of both home and pre-school experience, Sylva et al. (2011) findings suggest that the quality of home learning has a strong influencing factor in "shaping children's development"(110). With regards to this thesis it raises the question of how social and cultural influences mediate children's schemas? And how young children's schemas translate and transform across the different boundaries within a child's life? Does the home learning environment influence young children's schemas? This thesis will address these questions.

Melhuish, Phan, Sylva, Siraj-Blatchford and Taggart (2008) explain how, within the home learning environment, children's development is enhanced through not only stimulating activities but also and more importantly "by developing the child's ability and motivation concerned with learning" (97). From an early age, the extent to which parents become involved in activities such as reading to their child, visiting the library, playing with letters and numbers, singing nursery rhymes, mark making, "has a significant effect on a their child's educational achievements"(21). Melhuish et al. (2008) findings suggest that "while other family factors such as parents education and socioeconomic status (SES) have some relevance", parental involvement within the home learning activities exert a greater and long lasting influence on children's educational attainments" (106),

thus justifying the DfE (2011b: 21) statement that "What parents do is more important than who they are".

2.11 The home environment: The social context

Recognising "the most important influences on children's early development are those that come from home" (Tickell, 2011: 8), the discussion will explore how a child's development is shaped from within the home context. Taking the premise that young children are active participants rather than just bystanders and observers in their social worlds infers that children's development will be facilitated or constrained by the cultural context they inhabit. Indeed, Lam and Pollard (2007:126) explain that the cultural beliefs within each family provide children with their first social experiences.

Vygotsky (1978) stressed the role of the social and cultural context within learning by identifying children as active and social learners, who acquire socially constructed concepts through interaction. Vygotsky (1978) viewed children's development (learning) as a process that occurs on two planes:

> Within a general process of development, two qualitatively different lines of development, differing in origin, can be distinguished: the elementary processes, which are biological origin, on the one hand, and the higher psychological functions, of sociocultural origin, on the other. The history of child behaviour is born from interweaving of these two lines. Vygotsky (1978:46)

Utilising Vygotsky's social cultural theory, Rogoff (1990) introduced a third plane, the institutional practices adopted within a community:

> Depending on the circumstances, both immediate and societal, as well as the individual characteristics of the person, appropriate development may take many courses. This is not to say that development is aimless. Although chance plays an important role in the characteristics of the circumstances and of the person, the activity of the individuals and their social partners has purpose. Development involves progress towards local goals and valued skills (1990:56-57).

Rogoff acknowledges that the acquisition of development and knowledge occurs on three interconnected planes (Rogoff, 1998), the intrapersonal (child), interpersonal (social interaction) and community (contextual) plane. Edwards

(2006) describes the 'transformative process' that takes place, as all three planes interact through "participation in a community activity" (2006:239), thus accepting the importance of early childhood experiences coupled with the positive and influential effect of high quality experiences gained from within the family and home. The quality and diversity of the interactions between the child and their parents will determine the quality of the learning experience asserting "what parents do is more important than who they are" (DfE, 2011b: 21). The influence such interactions have on young children's schemas will be explored within this thesis.

Theorising about child development, Cole (1998) also describes a third force, suggesting that biological and environmental factors "do not interact directly. Rather, their interaction is mediated through a third factor, culture" (1998:14). The notion of culture as a holistic feature within child development can be a difficult concept to understand and visualise (Shore, 2002 and Super and Harkness, 2002). When working with parents and young children, Page et al. (2013:155) stress the importance of recognising "the diverse context of family cultures; their ethnicity, their faith, their languages, their moral frameworks, their way of parenting." Rather than highlighting the dynamic and fluid entity of culture, such a conceptualisation (Smidt, 2006:77) highlights the differences; putting forward the idea that culture is somehow fixed or given to those who are born into it. In contrast, Edwards, Knoche, Aukrust, Kumru and Kim (2005:141) define culture as a "complex system of common symbolic action patterns built up through everyday human social interaction." Viewed from this standpoint, Edwards et al. (2005) infers changing people's patterns of social interaction offers the possibility of influencing cultural practices. Suggesting, through a programme of intervention, government policy (DfE, 2011b, 2012, 2013b) aimed at parental involvement in children's learning, provides an opportunity to bring about change, thus enabling all children to gain the best start in life (DfES, 2004). A central aim within this thesis is to make a contribution to this area of knowledge.

In his explanation of the concept of culture, Cole (1998) uses a metaphor of a garden and growing crops to illustrate how the values and beliefs cultivated within one environment are shaped and influenced by other intersecting values and beliefs. Explaining that within the "garden", it is possible to select the correct conditions to nurture seeds and promote growth. However, the "gardener" must also be aware of other external conditions surrounding the garden area, as these will also have an effect on the seeds' development (1998:15).

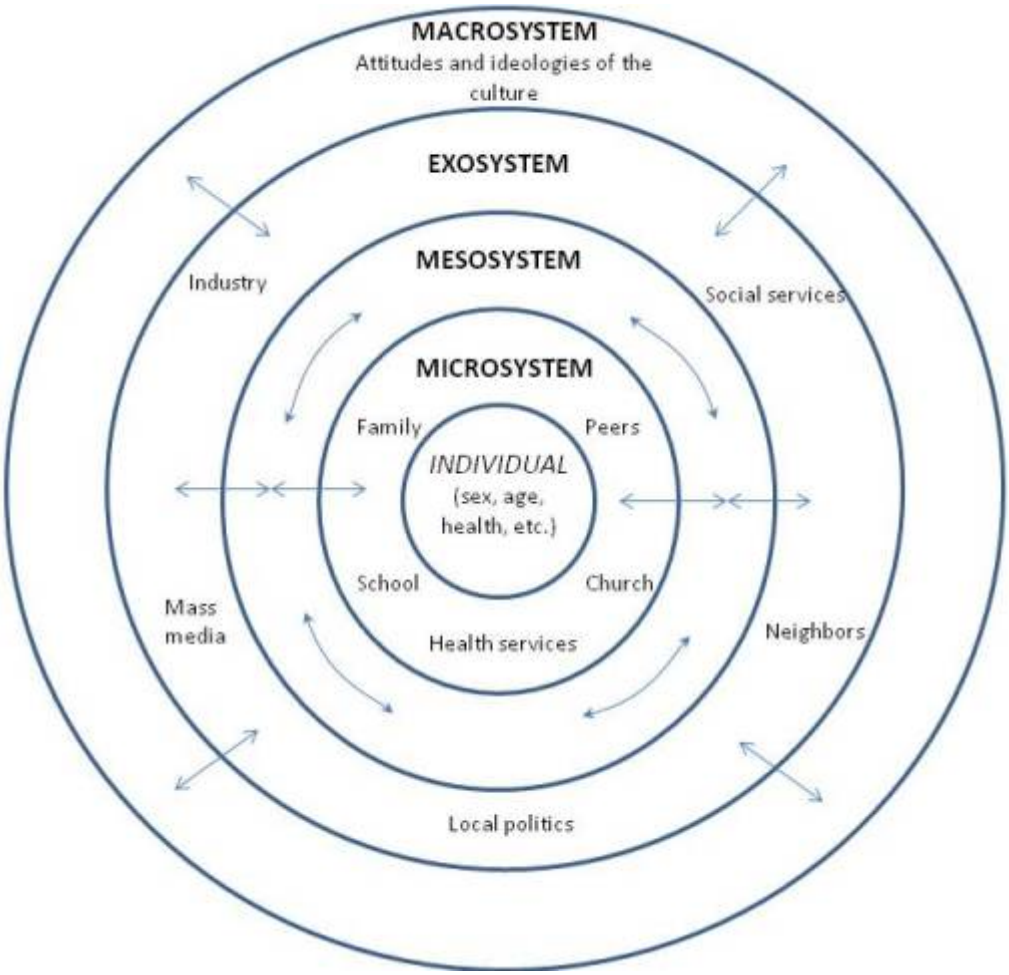

Figure 2.1

Bronfennbrenner's ecological theory

Placing "parents and children at the heart of services" (DfE, 2011b) echoes the views of Bronfennbrenner's ecological theory model (1979) and the theoretical approach adopted by Evangelou, Sylvia, Kyriacou, Wild and Glenny (2009). Such a model can be used to illustrate the developing and intercepting cultural environments inhabited by young children and their families. This model can be visualised as a set of concentric circles within each other, demonstrating the movement from the most intimate setting within the child's life in the centre to the more remote context beyond. The home environment and family cultural practices is the innermost circle (microsystem). Within this study Emily and Hannah's stories provide an illustration of how the home learning environment influences and directs their leaning. The next circle (mesosytem) represents the extended links outside of the home, the nursery setting, the church, and the parent groups etc. that will have an impact on the child and families experiences of culture. The following circle (exosytem) represents aspects that have a less direct influence on the child and families first hand experiences, such as the parental work place, community networks, and finally there is the most remote circle (macrosytems), which still has an impact on the family and child's life in the form of social systems, such as the law and economic and educational policies. Placing parents at the centre of all services (DfE, 2011a) highlights the influence and impact all professional agencies can achieve with parents. Thus potentially identifying a new audience of professionals who need to acquire a greater insight and understanding of the pedagogical needs of two year old children.

The following section will explore the mediating and shaping role of home learning and more importantly recognise the role culture plays in "shaping children's development"(Sylva et al., 2011:110).

2.12 Collaborative relationships

Desforges and Abouchaar (2003) and Sylva et al. (2004) highlight the relationship between parental involvement and children's academic achievement, identifying that children are more likely to succeed in school if parents are actively involved in their child's learning and development. The most

recent version of the EYFS (DfE, 2012:4) requires providers to work "in partnership with parents and/or carers". Nevertheless, Greenfield (2011) considers that a "discrepancy" exists between the intent of guidelines and "what actually happens" (110).

Involving parents in young children's education is not a new concept. Bradburn (1976) presents how Margret McMillian recognised that to improve young children's lives there was a need to also educate the parents. McMillian attempted to bring about change in children's lives through the involvement and education of parents:

> I am glad to think that many of them look upon us as friends- they bring us their troubles, show us their letters…I m quite sure that it is only by the personal touch that they can be helped and influenced. (McMillan cited in Bradburn 1976:155)

How far we have come when nearly a hundred years after McMillan's work, it is only due to statutory requirement that some providers of young children's care and education are developing "partnership working" between practitioners and parents or carers (DfE, 2012:2).

The term partnership working suggests equality of relationship developed between parents and practitioners. Nutbrown (2011: 165) suggest the term "collaborative relationships" as a relationship developed through the sharing of parent's knowledge of their child together with the practitioner's professional knowledge, to piece together the child's learning. Neither the importance, nor the level of skill required to develop such a working relationship with parents can be underestimated (Athey, 2007; Nutbrown, 2013; Sylva et al., 2004). Parents are not a homogenous group; they come with many culturally constructed ideas and beliefs about child development and parenting practices. Page et al. (2013:157) point out that "there is no blueprint" for working with parents and practitioners need to be able to demonstrate sensitivity, empathy and understanding, whilst also having effective pedagogical understanding of child development (Atherton 2013; Nutbrown, 2011; Sylva et al., 2008 and Athey 2007). A major aim within this thesis is the uncovering of a "conceptual knowledge"(Athey, 2007:29) that

will facilitate practitioners and parents to gain a greater insight and understanding of how their children learn. Within the thesis design a major methodological consideration is the ease and accessibility of the findings to ensure access is available to a wide-ranging audience.

Underpinning Nutbrown's (2011: 165) belief that "sharing pedagogy with parents can be like opening doors to a new world", Athey (2007:201) describes how at the start of the Froebel Early Education Project (1973-1978), there existed a "conceptual gulf " between practitioners and parents by explaining it was from the use of "genuine open-ended" enquiry to grow a shared understanding of children's patterns of cognition that parents and professionals developed a "genuinely respectful" view of each other's knowledge (202). Only through viewing parents as "capable partners" the "true power of early childhood education" is recognised (Baum and Swick 2008:579). Thus, it can be argued that only, when parents and professionals work within a collaborative relationship, children's true achievements will be both understood and acknowledged. This exemplifies Nutbrown's (2011: 165) vision of "parents, professionals and pedagogy, into practice" a view reflected in this thesis.

To summarise, this chapter has recognised the important and influential role of parents and the home learning environment in ensuring young children's future achievements. In putting "children and families at the heart of services" (DfE, 2011b: 2) government policy has the opportunity to influence children's lives through enhancing parents, knowledge, understand and beliefs; the cultural practices. This can have the effect of narrowing "the gap between those children who are doing well and those who are not" (Pugh, 2010:13), and identify the need for practitioners to be both confident and articulate in recognising, understanding and sharing pedagogical knowledge with parents. This aligns with the major contribution to knowledge this thesis aims to achieve.

Educational aims should not just be about raising academic attainment within schools and various settings; education must also be holistic and inextricably linked with every aspect of a child's experiences and life. This thesis illustrates

that it is only when education moves beyond the sole aim of academic success, that it can provide alternative solutions for building collaborative relationships between parents and professionals.

The following chapter will consider the methodological implications for the design and implementation of this thesis.

Chapter 3 Methodology

3.1 Introduction

This chapter discusses how the research question has been developed with relation to the chosen topic and identifies my personal focus of interest. This is followed by a discussion of my positionality with relation to the thesis, identifying my epistemological beliefs in relation to the place of feministic methodology. Section 3.3 provides an overview and justification of the methods and methodological issues that are key to this thesis, while section 3.4 provides a critical overview of methodological approaches used in other studies that seek to cross the cultural boundaries between home and school experiences. From this discussion I am able to illustrate the process I went through to plan the method of enquiry used in this thesis. This is followed by a discussion in section 3.5 considering the wider role of case study methodology in qualitative research. Section 3.6 justifies the research design and examines some of the ethical issues associated with working with young children as research participants. An explanation of how the observations were carried out accompanies an assessment of the dilemmas, deliberation and challenges related to the thesis. Finally, the chapter concludes with a brief introduction to how the children's experiences will be shared and told as narrative interpretations.

3.2 Devising the research question and the rationale

The completion of this thesis has taken many twists and turns; it has been an immense learning curve in which I have become truly encapsulated within. As Clough and Nutbrown maintain:

> The ways in which we choose to conduct our enquiry, the nature of our questions and the moral intent are expressions of our positionality and will govern the way in which we craft and change the research act itself. (Clough and Nutbrown, 2007:10)

To develop the research question I followed Cohen, Manion and Morrison's (2000) suggestion of developing a question through the construction and translation of my interests and the aims of the study. In reality this proved to be

a relatively uncomplicated process. I made lists and notes of my ideas, feelings and aims; the following is a summary of those thoughts.

Different identities

Over the past 20 years within my many identities – mother, parent, practitioner, education consultant and lecturer – I have supported many parents and practitioners who live and work with young children. On occasions, and for different reasons, I have found this to be a difficult task; however throughout this time the key tool I have held on to and come to trust is the concept of schema (Athey. 2007). I have used my knowledge of schema to help me tune into children, and by moving beyond the familiar I have been able to open up a new and alternative way of understanding what were once familiar sights (Clough and Nutbrown, 2007).

I have used my knowledge of schematic behaviour patterns to:

- Support and develop practitioners' observation skills
- Help practitioners and parents tune into young children's interests
- Help parents and practitioners understand young children's unusual behaviours or fascinations.
- Support practitioners to develop and extend practice and provision.

My approach within this thesis is to further my knowledge, through a process of discovery (Denscombe, 2007), to explore if and how the different cultural environments of home and nursery impact on young children's schematic interest. As both a researcher and practitioner I wanted to come closer to understanding young children, more specifically two-year-old children. Alongside my personal interest, the government's intention to expand free early education to 260,000 places for two-year-olds by 2014 (DfE, 2011c) identifies the need for the development of new knowledge together with a greater understanding of how to support practitioners and parents of two-year-old children.

In recent years I have been greatly influenced by the use of narrative as an accessible way to present research findings. As Bowman (2006) describes, narratives have the ability to "convey the shape and character of human experience" (7). It is important to me that the findings are presented in an accessible style that represents the participants' external realities, by this I mean viewing the experience and behaviours of the participants in context with their lived experiences (Connelly and Clandinin, 1990; Robson, 2002). It is due to this belief that I adopt a narrative format for the presentation of the data, providing the reader with the opportunity "to dwell momentarily" (Barone, 2001:25) within the children's lives and providing a "three-dimensional experience" (Clandinin, 2006:47) with the intention of stimulating thoughts, pictures, sounds and even smells to form in the reader's head.

I found writing down my thoughts to be a useful process, since it provided a base to question and re-interpret my interests. As my ideas were translated and refined (Cohen et al., 2000) the following research questions evolved:

The stories of four young children's schematic explorations within their lived experience.

7 What does a two-year-old child's schema look like?

8 How do schemas support individual young children's thinking (cognitive development)?

9 Do schemas translate and transform across different boundaries within a young child's life?

10 How do social and cultural influences influence children's schemas?

11 To what extent does schematic behaviour contribute to young children becoming social actors in their own life?

6. What kind of environment and pedagogy can support children's schematic explorations and development?

The thesis does not involve the collection of numerical data that requires statistical data analysis (Robson, 2002). My concern was an in depth study, gathering detailed evidence from a small group of participants, which justifies a qualitative approach (Clough and Nutbrown, 2007; Cohen et al., 2000; Robson, 2002). This will be discussed in further detail in section 3.3

Coming to terms with my positionality: a feminist approach

When I first began to consider the methodological implications for this thesis I did not consider myself to be a feminist researcher, partly due to my previous preconceived ideas and understanding of the term 'feminist'. I associated feminism with someone who is concerned only with the inequality between men and women. In fact Letherby (2003) describes feminist researchers as those who are committed "to produce useful knowledge that will make a difference to women's lives through social and individual change" (4). Feminist methodology, therefore, did not immediately align with my intentions for this study. However Aldred (1998) suggests that feminist approaches, among others, can encompass relationships with power through exploring forms of marginalized groupings including young children. Burman and Stacey (2010) suggest that there has been "little explicit discussion" regarding how the child and childhood are understood within the feminist approach to research. In every stage of considering and planning this thesis I considered issues relating to marginalization and power relationships to be a dominant factor. Nutbrown (2010) insists "when we involve young children in our research, we have to hold a clear awareness of … what we really think about young children" (11). Lahman (2008) conveys how young children can easily and frequently are constructed as a vulnerable, dominated and powerless group within society. Janzen (2008) explains this to be a developmental perspective, explaining that placing value on meeting future goals assumes children need to progress to the next stage, moving from "lesser" to "better", highlighting the deficits in their abilities (290). In contrast I side with Malguzzi (1998), who considers young children to be recognised as "contributing beings" in their own right (52), holding a place of worth in society, where power and authority are considered within the construction of the adult-child relationship. With this in mind the primary focus of this thesis is to develop a deeper understanding of young children's schematic interests, identifying how this can provide evidence of young children as contributing social actors in their own lives.

Although I am a woman I was initially less than confidant that the study of young children could be classified within the feminist agenda. Kaufman (2007) advises:

> The questions we ask (or do not ask) and the moral imperatives that provoke that inquiry are as important to feminist scholars and teachers as the answers we find. As feminists we are committed to the dictum that *how* we study determines *what* we know (681).

Every aspect of this thesis has been carefully considered from formulating the questions, to sharing the findings, I have tried to weave my beliefs and values throughout the whole process. Hesse-Biber (2007) describes this as the "theory and practice of research" (4) suggesting, "feminist research encompasses the full range of knowledge building that includes epistemology, methodology and method" (4).

As I struggled to fully articulate and accommodate my positionality with regards to feminist research I found some clarity and affinity with Hesse-Biber and Piatelli's (2007) discussion regarding feminist research praxis.

Within this discussion Hesse-Biber and Piatelli (2007) identify the following themes relating to the feminist approach to research:

1. Dynamic interaction across the research process of epistemology, methodology and method
2. Multiplicity of approaches
3. Attention to the situatedness of knowledge
4. Knowledge is located in particular time and space
5. Knowledge building is a relational process between researcher and participant
6. The continual negotiation of power imbalances
7. The interpretation of lived experiences
8. Can challenge conventional assumptions
9. The illumination of marginalised groups

Concluding "listening, interacting, sharing and translating are some of the techniques feminist have developed to foster greater connectedness, understanding and self empowerment (148)

Researchers must accept that epistemological and methodological choices have consequences, however it is this *recognition* that Kaufman (2007:687) believes "is critical to a feminist consciousness". Signifying many of the above

characteristics can and do apply to research being undertaken by researchers who would not be considered to be within the feminist praxis.

Hesse-Biber and Piatelli's (2007) synergy of the contributions and characteristics of feminist epistemology, methodology and methods resonated and fitted with what until this time I had deemed as my own unique research values and epistemological beliefs. Epistemological beliefs are concerned with the theory of knowledge, the "nature and validity of human knowledge" (Wellington, 2000:196) and "the relationship between the inquirer and the known" (Denzin and Lincoln, 2005:22) in essence, what needs to be known and how knowledge is gained. Within the feminist debate Letherby (2003) suggests too much attention has been given to the consideration of knowledge production; Letherby rightly asserts that it is the connection between "knowing and doing" (2003:3) that must underpin the researcher's methodological and epistemological beliefs throughout the research process. Considering feminism a "perspective, not a method" (Reinharz 1992:241), it is my conscious intention as a researcher to "create a tight link between the elements of the research process – epistemology, methodology and method" (Hesse- Biber. 2007:15). This means that I am able to position myself within the realm of a feminist researcher. It has not been an easy journey, however I can now state that within this thesis I will adopt a feminist perspective.

3.3 Current research characteristics

Tashakkori and Teddlie (2003) describe how social research has undergone many changes in the last 30 years, moving from the mainly dominant world view of objectivity and value neutrality held by the positivist researcher to the "subjective, culture bound and emancipatory approach" of the qualitative researcher (2003:ix). Hendry (2010) reports the concept of quantitative versus qualitative is a taken for granted conceptualization within the research paradigm. Denzin and Lincoln (2005:10) define quantitative studies as those, which "emphasize the measurement and analysis of causal relationships between variables … Proponents of such studies claim their work is done from within a value-free framework". This is not a stance I identify with, for it is only

through foregrounding and understanding the uniqueness of each child that I will be able recognise and interpret the phenomena. While I am interested in observing the repeated actions children make, I do not consider this to be a form of measurement. It is not my aim to "strive for objectivity, measurability, predictability, [and] controllability" (Cohen et al., 2000:28). My approach within this thesis is to further my knowledge and understanding through a process of discovery (Denscombe, 2007), not simply to identify the possibility of young children's predictable schematic actions. I am looking to situate myself within the child's world, to attempt to make visible and interpret the child's actions through a series of observations and conversations with key adults who have a deep knowledge about the child. Such an approach is defined as qualitative by Denzin and Lincoln (2005:3) who explain "qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them". Denzin and Lincoln (2005:4) also explain that the qualitative researcher will use a variety of "interpretive practices" to develop their understanding; this is an approach that feels comfortable and supportive with regards the aims and objectives within my study. Interestingly, Hendry (2010) describes this as a "binary construction" implying such a stance can be described as postmodern or cutting edge (73)

A critical approach

A third paradigm is defined by Cohen et al. (20001) to be that of critical educational research, in which the researcher's aim is extended past that of simply "understanding situations and phenomena"; within a critical approach the researcher seeks to "emancipate the disempowered, to redress inequalities" (28). Similarly, Chase (2011), Clough and Nutbrown (2007) and Cohen et al. (2000) all indicate that the purpose of feministic enquiry is to facilitate an emancipatory approach, where the presence of the voice of the participant enables empowerment. From the onset of my career as a practitioner, now following on to that of a researcher, my main aim has always been to build relationships with the children and their families, constructing equal partnerships and ensuring all members have a voice that can be both listened to and valued.

Aldred (1998: 155) questions how, or even if, adult researchers can legitimately represent children's voices, warning against the political and ethical dilemmas of presenting the lives of marginalized groups and explaining that "alternative epistemological perspectives" affect not only how researchers hear children's voices, but also how they will go about *trying* to hear such voices.
In considering epistemological perspectives Chase (2011), Clough and Nutbrown (2007) and Cohen et al. (2000) all indicate that the purpose of feministic enquiry is to facilitate an emancipatory approach, enabling the empowerment of the voice of both the researcher and participant. Such an argument has caused much contemplation concerning the quality of the knowledge this thesis will produce. Aldred (1998) provides clarity in this aspect, suggesting that the adoption of different methodologies can "provide different claims for the status of the knowledge produced" (147).

If I am to be able to claim that the stories of the children in this thesis form an honest portrayal or a faithful representation of their experiences, and so to further the public debate on the practice of working with young children in day care settings, the research study needs to be both rigorous and meaningful. This:

> Involves being clear about one's theoretical assumptions, the nature of the research process, the criteria against which 'good' knowledge can be judged and the strategies used for interpretation and analysis. In feminist work the suggestion is that all of these things are made available for scrutiny, comment and (re) negotiation, as part of the process through which standards are evaluated and judged.
> (Maynard, 1994:25)

I take some degree of comfort from Hesse-Biber and Piatelli's (2007) belief that the interpretation of the participant's voice, together with the knowledge produced, is influenced by the researcher's epistemological perspective. Epistemological assumptions are concerned with the theory of knowledge, the "nature and validity of human knowledge" (Wellington, 2000:196) and "the relationship between the inquirer and the known" (Denzin and Lincoln, 2005:22), what needs to be known and how knowledge is gained. In simple terms, epistemological perspectives influence researchers' assumptions and, partly, govern why they do what they do.

It is at this point I once again have to consider the methodological approach that will need to be adopted if I am to capture the complexity, and subtlety of real life with young children, "the personal and up close" (Bowman, 2006:7), rather than abstract or general information. The following sections will identify and consider how such a methodological approach is conceived.

Raising the question of methodological approach

According to Silko (1997:27)"Viewers are as much a part of the landscape as the boulders they stand on". While this sentence is simple it is also powerful and provocative, and conveys my ontological and epistemological feelings for this thesis. Although the main data has be gained through an observational approach, I do not believe it is appropriate or correct to describe the methodology adopted to be that of an ethnographic study, even though several characteristics of the study fit within an ethnographical methodology (Cohen et al., 2000). A main feature was the responsive and interactive relationship with the research participants, that enabled and supported opportunities for shared discovery and learning together; Clandinin and Connelly (2000) describe such a relationship as dynamic, with growth and learning together being part of the research process.

To succeed with this research I needed to develop a relationship with my participants, allowing me to enter the different boundaries and context of their lives, both the nursery environment and home, in the anticipation and expectation that I could observe, share, make sense and develop meaning between the data collected across these boundaries. As Clandinin and Connelly (2000) have reported, I wanted to collect the children's lived experiences, to piece together and reconstruct these experiences and actions in relation to other adults, to the environment and the social milieu of their daily lives. I wanted to acknowledge, as Pinnegar and Daynes (2007) explain, that humans are embedded in a context, that my participants have experiences of cultures, events and histories that affect and influence the present. This suggests that the children within this thesis have become who they are as a result of the parental ethnotheories (Harkness et al. 2010) they have experienced so far, and implies that the adoption of narrative inquiry as a methodology may be a suitable fit for

my requirements. Pinnegar and Daynes (2007) further describe that within this methodology researchers also use some form of narrative in some way within their research; the adoption of a narrative inquiry approach to research "embraces narrative as both the method and phenomena of the study" (Pinnegar and Daynes, 2007:5). In simplistic terms the narrative inquirer studies experience (Clandinin, 2006), using narrative to reconstruct the participants' experience in relation both to others and to the environment (Pinnegar and Daynes, 2007). Narrative inquiry, therefore, enables researchers to collect stories of how humans experience the world, and write narratives of those experiences.

In considering narrative inquiry Pinnegar and Daynes (2007:7) claim that researchers make "four turns in their thinking" as they move towards a narrative inquiry approach to research.

> 1. A change in the relationship between the person conducting the research and the person participating as the subject, (the relationship between the researcher and the researched)
> 2. A move from the use of numbers to the use of words
> 3. A change from a focus on the general and universal towards the local and specific
> 4. A widening in acceptance of alternative epistemologies or ways of knowing.
>
> (Pinnegar and Daynes, 2007:7)

Pinnegar and Daynes (2007) use the image of water to describe how researchers make their turns, suggesting some are slow and meandering; my own experience can better be described as four separate streams seamlessly flowing together to produce a river with the strength to find its way across any differing landscape on its journey to the sea. The adoption of a narrative inquiry approach appears to fit into and incorporate my own epistemological perspectives:

> Narrative inquiry it is a way of understanding experience. It is collaboration between researcher and participant, over time, in a place or series of places, and in social interactions with milieus. An inquirer enters this matrix in the midst and progresses in the same spirit, concluding the inquiry still in the midst of living and telling, reliving and retelling, the stories of the experiences that make up people's lives, both individual and social.
> (Clandinin and Connelly, 2000:20)

Bowman (2006), in his essay about the significance of narrative inquiry for music education, suggests narrative inquiry should have no "definitive rationale" (5). This is in contrast to Clandinin and Roiek (2007:38) who claim the Deweyan theory of experience is central to the narrative inquiry epistemology. Dewey's (1916), description of experience is complex: he claims that experience it is not simply activity, when we experience something we act upon it, we respond to it, we do something with it. From a Deweyan standpoint experience requires "backwards and forwards connections" it is "characterised by continuous interaction of human thought with our personal, social and material environment" (Clandinin and Roiek, 2007:38). Thus, knowledge arises from experience and must return to that experience to hold any worth, suggesting that "experiences grow out of other experiences, and experiences lead to further experiences" (Clandinin and Connelly, 2000:2).

Clandinin (2006:47) uses the Deweyan theory of experience to define narrative inquiry as a three-dimensional metaphorical structure, consisting of:

- The personal and social interaction (interaction)
- Past, present and future (continuity)
- Place (situation).

Throughout my inquiry it is this same three-dimensional space I wish to inhabit with my participants:

- The interest, the curiosity, the caring, the understanding, the being there (interaction)
- The making sense, the reflection, being alongside following the journey (continuity)
- The nursery environment, the home environment: across the boundaries of space (situation).

It is anticipated, in working within this three-dimensional space, that the relational dimensions between researcher and researched will be heightened. Using Clandinin's (2006) structure, to be able to listen, observe and live alongside, while constructing and co-constructing experiences and knowledge, and becoming part of the landscape in the lives of my participants.

3.4 The bigger picture: recent narrative inquiry

> "*Understanding how one understands in a changing world*"
> (Clandinin and Connelly, 2000:8)

In this section I will review the previous use of narrative inquiry as a methodology for conducting research studies with young children in the field of education. Methodological points from recent research papers will be discussed to illustrate the considerations undertaken whilst planning this thesis, concentrating on the work of Chan (2010), Clandinin (2006), and Clandinin et al (2010).

Narrative inquiry set within the context of education is connected with the development of a deeper understanding of the lives of practitioners, children and families. Clandinin et al. (2010:81) describe this as the "professional – knowledge landscape" meaning that since practitioners, children and families temporarily inhabit the connected spaces and places, a moral and intellectual relationship develops between all parties. To engage in narrative inquiry requires the researcher to come alongside the participants, becoming part of the landscape that is under study:

> The interwoven relation between narrative as phenomenon and narrative as methodology is central to our work and central to our understanding that narrative inquiry is relational inquiry. Narrative inquiry is the study of relation studying the experience of people in relation.
> (Clandinin et al., 2010:82)

Clandinin et al. (2010) describe how they lived alongside participants, spending time in school classrooms, hallways, staff rooms, playgrounds and family living rooms, composing field notes, acknowledging how the researcher s learnt from each other as well as from the relationships with the participants.

In partial contrast Chan worked as a single researcher, examining and exploring the experiences of Ai Mei, a Chinese immigrant student and her participation in a

Canadian middle school. Chan describes exploring "the interaction of influences contributing to Ai Mei's sense on identity" (2010:115).

Clandinin et al's (2010) experience describes how the importance of relational inquiry can be illuminated through "bumping places" (83). This process described how researchers identified and observed how research participants, who are placed within different social, cultural, linguistic or institutional professional knowledge landscapes, would experience tension and bump against each other. Describing research undertaken within Ravine Elementary and City Heights School in Canada, Clandinin et al (2010) explain how Lia's life experience out of school bumped against and caused tension within the school; it was however only through observing and identifying 'bumping places' that researchers came to understand "bumping as a negotiation of stories" (Clandinin, 2006:11). A further example of using 'bumping' as a point of negotiation between participants and researcher is also illustrated by Clandinin (2006) in a paper where Clandinin shares the stories of Kristi, the class teacher, and Josh her student. Kristi believes Josh has not understood a particular assignment he was asked to complete, but in reality his story had bumped against Kristi's story:

> This bumping created a tension as she [Kristi] dismissed his work as either an expression of his not understanding the task or not understanding the concept of community.
> (Clandinin, 2006:48)

Clandinin reveals this caused a tension within her, and explains how the "tensions helped us identify, inquire into and represent the narrative threads that lived within individuals' stories" (83). Such tensions provided the opportunity to look forwards and backwards, inwards and outwards to identify plotlines.

3.5 From methodology to methods

Athey (2007) believes that an exciting aspect of professional development for practitioners is the identification of individual learning. One of the major aims within the thesis is to capture the wholeness and integrity of young children at

play, in order to provide a lens to "unravel the complexities of a given situation" (Denscombe, 2007:36). I intend to observe individual children during freely chosen or spontaneous episodes of play (Bruce, 2005) both in the nursery setting and in the home environment. Robson would define this as a case study, since "the *case* is the situation… we are interested in" (2002:177).

Cohen et al (2000) draw on Hitchcock and Hughes' (1995) work to identify the specific characteristics of a case study:

- It is concerned with a rich and vivid description of events related to the case.
- It provides a chronological narrative of events relevant to the case
- It blends a description of events with analysis of them
- It focuses on individual actors or groups of actors, and seeks to understand their perception of events.
- It highlights specific events which are relevant to the case
- The researcher is integrally involved in the case
- An attempt is made to portray the richness of the case in writing up the report.

(Cohen et al., 2000:182)

Denscombe (2007) explains that case studies can be visualised as a spotlight focussing on individual instances. In this case study, the child and the freely chosen or spontaneous episodes of play will be spotlighted with the intention of investigating unfolding interactions and events by "illuminate[ing] the general by looking at the particular" (36).

Skate (2005) identifies differing types of case study; it is my belief the current study falls between the boundaries of *intrinsic* – undertaken because the particular case is of interest – and *instrumental* – studied because it may shed light on a more general issue. It is my intention to tease out and tell the stories of the individual children, however it is anticipated that each story will be unique to the particular child as it is only through their own experiences and relationships that the story can be constructed and captured. This thesis, therefore, is being undertaken because of my intrinsic interest in each participant. However I also hope to facilitate and develop a greater insight and understanding of young children's developing "conceptual knowledge" (Athey 2007: 29). The intention is

to share the new knowledge on a local level with parents and practitioners and also with the wider early years community through the writing and submission of articles, thus illustrating an instrumental motivation. As Skate (2005) suggests, there are no hard boundaries between intrinsic and instrumental case studies, "but rather a zone of combined purposes". Skate implies that the typical qualitative case study requires the researcher's continuous presence and on going interpretation of the data, as:

> Qualitative case study is characterized by researchers spending extended time on site, personally in contact with activities and operations of the case, reflecting, and revising descriptions and meanings of what is going on.
> (Skate, 2005:450).

I accept this role and look forward to becoming the typical case study researcher who observes, ponders and deliberates, looking to locate meaning in the context and experiences of the participants (Cohen et al., 2000).

3.6 Dimensions of ethics

It is understandable that as a result of various media reports highlighting the possible perceived risk to children from adults, and even other children, the levels of protective care and governance of children and their lives has intensified in recent years (Kellett, 2010; Nutbrown, 2010; Percy-Smith and Thomas, 2010; Farrell, 2005). Farrell suggests this has meant present-day research ethics have become subject to heightened "accountability, control and regulation" (2005:2), fuelled by the requirement to reduce or limit risk, whilst Nutbrown (2010) asserts this to be not only a result of the "riskier times" (5) but also of the increased level of involvement and input children now have with social research projects.

Such vigorous concerns regarding the "ethical safety" (Page et al, 2013:45) of the participants and the researcher, especially when involving young children, have resulted in the introduction of ethical codes (Christians, 2005), requiring all universities in England to initiate ethical review procedures when human participants are involved. Nutbrown describes how, even in 2010, "Ethical issues

with regard to research that involves young children are, nevertheless, identified against a background … of fear and even suspicion" (2010:5).

The University of Sheffield (2011) operates an ethical review system (Appendix1) for all research involving human participation, a review system which seems to align with Farrell's (2005) view of reducing or eliminating risk, as the university considers all research involving children under the age of 18 years as high risk and requires researchers to provide assurances that no harm will come to either the participants or themselves and that informed consent will be obtained from all participants. Ellis (2007:4) describes these as ethics of "procedure" and "practice", ensuring researchers consider all practical and procedural possibilities that may happen whilst in the field, for example if safeguarding issues are identified or how anonymity will be ensured.

As a researcher working with very young children it is with some alarm that I read how Allen (2005) warns of the danger that, for many regulatory bodies and researchers, ethical applications could be reduced to an act of bureaucracy in order to fulfil the "cautionary process of risk management" (16). This would have the result of absolving researchers and institutions of ethical and moral responsibilities (Pring, 2004:38), rather than forming an important positive and moral component of the overall research design process. I choose to align my position with Connelly and Clandinin (1990) whose earlier work on collaborative research ethics illustrates the application and consideration of ethics as more than a negotiated application of procedures, principles and practice. This view is also supported by Page et al (2013) who further extend and illustrate this belief, suggesting the development of an "ethical framework" that can be used as a "working tool" to permeate from research design through to report writing (44). Interestingly, Murray, Pushor and Renihan (2011) describe the ethics review panel in a Canadian University as the "gatekeeper for what research will be done" rather than a panel who are "supportive and facilitative of research, particularly research that involves sensitive stories and vulnerable populations?" (53). Murray et al.'s (2011:45) reflective account gives details of the negotiation and discussions involved with the ethical review panel, although

no clear acknowledgement is made with regards to the adoption of an ethical "working tool", as described by Page et al (2013:44). It is made very clear that Murray has to convince the ethics panel that her "intentions are proper" (Murray et al., 2011:45). It appears that Murray achieves and articulates her 'proper' ethical intentions by the adoption of an 'ethical framework' that clearly permeates the whole research methodology and design.

I have also struggled at times finding that institutional ethical applications provide little support or guidance with practical and relational ethical issues, as they assume the research is being carried out using strangers, with whom I have no prior or future relationship (Aloni, 2008). Christians (2005) explains that a restricted definition of ethics is no longer adequate for the complex issues involved in studying the social world; a "neutral, objective observer" (148) will be able to discern facts but will ignore "the situatedness" of the situation, meaning all researchers bring their own subjectivity to their work. This view is strongly supported by Clark and Sharf (2007) who suggest all researchers enter into research projects as themselves, bringing with them their own unique values and subjectivity. A view further extended by Etherington (2007:600), who explains that in order for researchers to sustain "ethical mindfulness" and trust, the researcher must stay true to their values and character. I align this idea with Murray et al.'s (2011:49), definition of "multiple selves". In exploring this concept I am able to recognise that I am a researcher, a practitioner, a nursery owner and a mother. It is only through these joint lenses, therefore, that I am able to facilitate the relationships that allow me to gain such privileged access to the daily lives of young children and their families.

Clark and Sharf contend that the "relationship that is the heart of the matter" (2007:400). Ellis considers these "relational ethics" (2007:4) to be closely connected to the 'ethics of care' (Nodding, 1984 and Gilligan, 1982) and feminist ethics (Denzin and Lincoln 2005), suggesting that it is in fact these ethical values that support and allow researchers to deal with "the unpredictable, often subtle, yet ethically important moments" in research (2005:4). For example, Waling (cited in Page et al, 2013:45) explains how she altered a data collection method

by using a handheld video camera instead of a tripod-mounted version in response to a mother's feelings. Ellis (2007:4) indicates that relational ethics provide a starting point, requiring researchers to search their "hearts and minds" to "acknowledge interpersonal bonds", therefore enabling them to identify and understand the "dis-ease" (Huber and Clandinin, 2002:794) they encounter as they deal with the reality of social research with young children.

Gaining and negotiating young children's consent

Kellett (2010) highlights the ethical division and polarity used to gain informed consent, describing researchers who use the "captive environment" of schools to gain blanket consent through head teachers (2010:23) in contrast to researchers who realise the importance of spending time building up relationships and establishing an "environment of trust" (Page et al, 2013:46). I fall between these divisions, as a nursery owner I have an accessible audience however I do not view myself as only a gatekeeper. With ten years' experience I have built strong relationships with the families and children and consider myself more as a "research guardian" (Nutbrown 2010:171). I have a responsibility to both the parents and children to ensure that I use my position responsibly.

Denscombe (2007) reminds that participants have to be chosen on the basis of their relevance, meaning the participants within this thesis are required to be approximately two years of age and attend the nursery setting. Further practical considerations also influenced the sample selection.

- To ease the collection of data participants would attend nursery on a minimum of two days per week.
- A maximum of four participants would be manageable.
- To enable the data to be collected from both nursery and participants homes existing strong parental involvement with the setting was deemed desirable

With this criteria in mind in consultation with key workers four children were selected from the nursery register.

The University of Sheffield's ethics policy for research involving human participation (2011) requires the informed written consent of a child's parent. Before parents can give their informed consent they need an understanding of what is actually involved (Appendix 2). Adopting the position of "research guardian" (Nutbrown 2010: 171) I wanted to establish an open and transparent relationship with parents I felt it was important for the parents to realised in order for me to learn more about their child, I needed their help, knowledge and expertise. From the start and throughout the study I wanted to develop a relationship that made parents feel they were the experts on their child. Throughout the thesis the success of maintaining and developing relationships with parents came through preserving and sustaining the position of a researcher who wanted to learn from the parents.

I initially approached parents for an informal conversation; I wanted to allow parents time to consider my request, to have the opportunity to ask questions. If the parent was interested I then forwarded further written information about the study's purpose and the nature of their involvement (Clough and Nutbrown, 2007; Etherington, 2007; Fargas-Malet, McSherry, Larkin and Robinson, 2010). At this point three parents agreed to participate and returned the completed consent form, while one withdrew, as they did not feel they had the required time available to commit to the project. Although I was initially disappointed I also felt this demonstrated that participant consent had been freely given and was based on an informed decision (Fargas-Malet et al, 2010), proving both the strength of my relationship and the clarity of the written information provided.

Cocks (2007) warns that researchers must be aware that the process of gaining consent is not completed at the start of the research and then filed away. While I support this view, it was still with some surprise that I realised the frequency of references I made to consent as I listened to data in the home visit recordings. I frequently explained the research aims, ensuring that parents both understood and were happy to continue to be involved in the research project. This evidenced a process of passing information between researcher and participant that was not simply one directional, as stressed Danby and Farrell (2004), but instead made it into "a process rather than an event" (Etherington, 2007:603). I

agree with Nutbrown (2010:10) who suggests, "gaining access to child participants means gaining trust – not only of the child, but of the parent too". The following extract from my research diary demonstrates the level of trust gained:

> I could not believe it, it was only my first visit, I was so nervous I really did not know what to expect. I had been there for less than five minutes. I was still thanking her for agreeing to participate, I had not yet turned on the digital recorder, her husband was making cups of coffee, and she just casually told me about the depth of her post natal depression, how she really had initially felt no love for her 4 month old baby. I am sure I responded with an appropriate reply, but I was just overwhelmed by the immediate trust she seemed happy to place in me.
> (25th April)

Initially I felt shocked in the amount of trust parents placed in me. Clark and Sharf (2007:400) suggest as it is a relationship the researcher initiates, it is the researcher who must "bear prime responsibility". I felt this responsibility, I felt heavy with this weight of responsibility, was her eagerness to tell me a sign she was asking for help? Was there a reason she said it when her husband was not there? Was it because I am also a female and a mother? This was not a feeling I had expected or prepared myself to feel. On reflection I realised this is the reality of social research; I took solace in Huber and Clandinin's (2002:794) suggestion that researchers must try to "puzzle through our dis-ease" as we learn to live alongside the participants.

As I continued to make the home visits I believed the parental trust was in place, the objective now was to respect and maintain it; this also caused me much anxiety. The following is an extract from my research diary:

> I am concerned, I am not sure if Emily's mum does not understand, or is just trying to ensure Emily performs during my visits. Throughout the whole visit today, she directed and influenced the play. Initially I kept quiet and observed thinking it would change, it did not 35 minutes later she was still fully involved. Had I not made it clear, I just do not think she gets it!!
>
> What will I do if every visit follows this format, do I politely suggest!! I am **so** aware of the privileged position I am in, being welcomed into families' private lives, how can I turn around and say excuse me, but you now need to just let us get on? (24th April)

Clark and Sharf (2007) suggest the researcher bears the prime responsibility for such relationships and as such can find themselves with a "problem of conscience", (400). Ellis maintains such quandaries of conscience must be resolved using important "relational ethics" (2007:4), with the primary concern being the responsibility to ensure that no harm comes to the participants.

Whilst Nutbrown (2010:17) reminds researchers about their responsibility regarding "consent, anonymity, confidentiality, safety and wellbeing" she also raises the issue of photographic images. Phelan and Kinsella (2013) believe "visual methods can be particularly problematic," (84) suggesting photographic data can capture images " to reveal aspects of the individuals experience beyond their conscious control" (84). I gained consent to use both photographic and video images as a means of collecting data, with the expectation that photographic images will be presented in the analysis. In doing this I accept my primary responsibility is to consider the care of the children. In such situations Lahman (2008) perceives the child will be always be "othered" (2008:286). Phelan and Kinsella (2013) believe the use of visual methods introduces an "other level[s] of informed consent" (83). Warin, (2011) suggests when working with children there is a need to be explicit about how ethical practice extends to "form an on going relational concept rather than a one off activity"(813). I considered my ethical responsibilities went even further, it was my intention throughout the study to adopt Nutbrown's (2010:11) suggestion of viewing children as "other-wise - having a different way of knowing". At all stages throughout the research process the photographs were used to identify and highlight the child's way of knowing, illustrating their expertise in particular area, both their conscious and un conscious threads of thinking, so portraying them the experts, not children being "othered" (Lahman, 2008:286), but children viewed as "other-wise" (Nutbrown, 2010:11) children from whom researchers can respect and learn.

In the UK, Kellett (2010) explains there is no legal age for informed consent, suggesting that in most cases parental wishes take precedence and that it may not always be appropriate to seek children's written consent; however, this does

not negate the importance of gaining the child's permission (Dockett, Einarsdottir and Perry, 2009; Dockett and Perry, 2007). I believe that the choice of whether or not to give informed consent is the fundamental right of every child, and agree with Kellett who states that it is the "researcher's obligation" (2010:24) to gain each child's informed consent. This poses the question of how very young children can use their voices to communicate their wishes. Page et al (2013:46) describe "the importance of establishing an environment of trust", therefore allowing participants' voices to be recognised and heard as demonstrated in the following transcript from the visit to Abby's house:

> As I sat on the settee chatting to mum Abby came and stood next to me, put her hands on my face and turned my face towards her.
> "Play room, come my play room".
> (18th May)

To continue to ensure the "ethical safety and consent of those involved" (Page et al 2013:45), Dockett and Perry (2007) suggest that it is also important for researchers to consider "on going opportunities" (55), allowing children to negotiate, continue or withdraw their consent.

Figure 3.1

Gaining consent

On every observation occasion (whether at home or nursery) I made a point of seeking out the children and asking if I could come and play, I would show my camera and also ask if it was OK to take pictures. Interestingly during several of the home visits the children asked me to take photographs of a particular toy. Fargas-Malet et al. (2010:177) describe such occasions as opportunities to gain the child's "assent", suggesting that when children cannot use "adult-centric

attributes" such as verbal communication, researchers must observe their likes and dislikes. Cocks (2007:258) explains the importance of researchers remaining vigilant to the responses of the child, requiring researchers to be committed to becoming attuned to the participants in order to understand and recognise cues about the child's preferred involvement at any time (Dockett et al., 2009). I recorded an event with Hannah in my research diary that exemplified Flewitt's idea of "provisional consent" (2005:556). Diary exert:

> I had been in the nursery outdoor environment as I moved indoors, Hannah caught my eye, she looked at me then walked away. Although she used no verbal communication I felt the behaviour she displayed was different today, it felt like she was telling me she did not want to work with me today. I returned to the outdoor environment, I returned indoors later, but kept my distance from Hannah. Towards the end of the session when I was sat with a small group she approached and joined in with a short singing session. I made no recordings of Hannah that session.
> (3rd May).

On a further occasion when I visited Hannah at home, (23rd May); she sat cuddling her mother on the settee. It became apparent she had had a late night attending a family function the evening before. I read Hannah's behaviour as her way of communicating that she did not want to be involved today. I again made no recordings or collected any data from this session.

At the time I had not seen my experience with Hannah as any kind of issue or "problem of conscience" (Clark and Sharf, 2007:400). I had simply followed my instincts and behaved in a way that I was comfortable with. I do not really even recall that I had to think or ask myself "what should I do now?" (Ellis, 2007:4). I understood that Hannah had sufficiently demonstrated through her non-verbal language that she was not giving her assent to be involved that morning. Equally, I hope that by placing myself in a different part of the environment, away from Hannah, I was telling her that it was fine not to be involved, and that I would not make any further advances until she invited me to do so. I believe that I was true to my character and responsible for my actions and the consequences to others (Ellis, 2007).

My thoughts – Research diary

I kept a diary, I wrote about any thing that occurred to me regarding the study, my thoughts, my concerns and my ideas. After each observation I would write my initial thoughts and ideas sometimes these were very general regarding the feel of the session, other time I used this as a way to try to unpick and recognise schematic patterns. At times my thoughts would wake me up in the middle of the night, or arrive in my consciousness at other unrelated parts of the day. I enjoyed the process; it provided clarity and reality to my thoughts and ideas, Pelias (2011) point out "Writing is a strategy of circling, of making present what might have slipped away" (660). Recording my thoughts, provided a feeling of control and direction, when I became stuck I would return to reading theory and new ideas and thoughts would be stimulated. It felt like an unfolding story, with some of my most pronounced learning situated within. Lewis (2011) identifies sharing experiences through story elicits " my own potential for making meaning" (505).

Power and participation

An essential aspect of working with young children is the recognition and acknowledgment of existing and embedded power relationships (MacNaughton, 2005; Dockett and Perry; 2007). Etherington describes the need for researchers "owning up to their involvement" (2007:611); such transparency within the research process requires researcher's loss of anonymity, involving varying degrees of disclosure to the reader and providing further opportunities for renewing the recognition of the power issues that permeate all aspects of the research process (Dockett and Perry, 2007). Researchers cannot deny the power they hold. Nutbrown (2010) emphasises that such power not only needs to be recognised and acknowledged but also addressed, if young children are to participants within research rather than simply the objects of research. Dockett and Perry (2007) also identify that participants have power, regardless of their age, gender or maturity. When Hannah temporarily withdrew her consent (David, Goouch and Powell, 2005) to be involved in the research, she used her power to demonstrate both her resistance and control within the situation. The decision she made involved power.

This poses the question, what is power? Foucault (cited in Gallagher, 2008) offers a general definition of power as a mode of action, explaining that it is not something that a single person possesses, nor a capacity or a disposition; instead it is an action that has an impact upon other actions. This means that power does not exist in an abstract form; it is the power *to do* something. If Hannah had not chosen to use her power of assent to withdraw her consent, it would remain an "unrealised capacity or a potential, not a power" (Gallagher, 2008:397). Christians (2005:156) describes power as the "reciprocity between two subjects, a relationship not domination". This describes my experience, as through my relationship with Hannah I recognised her power and accepted it. Power, therefore, can be visualised as temporarily located in different spaces, initiated only if the community deems it to exist at that particular point in time and space, I suggest this means power is socially constructed (Gergen, 1982). If power exists only when put into action, the focus shifts onto *how* power is activated. Abbott and Langston (2006) describe a situation in which a film crew they were working with expected them to organise such events as "nappy changing" to take place at a particular time and location (41). In this situation it has to be queried how the adults are exercising power and with what effects. Is it to build conflict or consensus? Abbott and Langston's (2006) response was to "challenge, negotiate and cajole" the film crew (41), supporting Christians' (2005) view that dialogue is the key strategy to empowerment and "banishes powerlessness" (156), enabling Abbott and Langston to remain "true to their beliefs about how research with young children should be conducted" (2006:41).

Within this thesis the use of power has been important and powerful. Reflecting on my own situation, I had previously believed the power I held was as a result of my position as nursery owner and researcher. However, I now see this not to be the case, although Lahman (2008) would argue that I do indeed have power. Nutbrown (2010) implies it is not about the power as such; rather it is how I *exercise* or *use* the power that is important. I believe for me this means that to use *my* power will require a reciprocal relationship to be initiated between myself and another person, either the child, another staff member or the parent.

In asking myself how I wish to *use* power to build conflict or consensus I will instigate a dialogue, empowering the respondent (child, staff member or parent) to give voice and agency to their views, beliefs and understanding.

Recognition of the imbalance of power between the participants and myself prompted the exploration and eventual adoption of a feminist perspective (Aldred, 1998) within the methodological approach. Positioning the participants as "contributing beings" (Malguzzi, 1998. 52) seeing them as experts, from whom I could learn, meant the power temporarily resided with them. This could also be assumed of the parents and key workers; I valued and required their expertise. Yet I also have to acknowledge that it was I who made the final decisions, I wrote up the findings, such acknowledgement must also recognise this involved the process of retaking the power. In "Owning up" as Etherington, (2007: 611) explains it is my intention to provide both transparency and recognition to the embedded power relationship within this thesis.

3.7 The data, the stories

Photographs are described by Atherton (2013:30) as "pauses in action; they hold a moment which has gone but can still be seen." Within this thesis photographs have been used to capture the children whilst immersed in self-chosen play activities, so providing a way to identify and illustrate young children's schema. Pink (2007: 48) warns that the use of a camera "will impinge on the social relationships in which he or she becomes involved" within this thesis the importance was not about the image quality but capturing the "pauses in action" (Atherton 2013:30). My use of a camera was not to capture 'professional' images indeed many of the images captures are dark and grainy in quality. Before starting the data collection several cameras were trialled resulting in the selection of a small handheld digital camera with a large screen. Its choice was based on my ability to maintain visual contact with participants whilst also being aware of the images being captured on the camera. On reflection it is not felt the camera interrupted my view of the child. If at all its ease of use along with the zoom facility allowed me to capture close up images whilst also maintaining a

physical distance. This is especially seen in figure 7.51- 7.55 as George explores the log.

Prosser (2011: 479) explains visual researchers "focus on what can be seen" suggesting what is *seen* is based on an individual's perception and the meaning attributed to the image. Pink (2007:117) appears to support this view identifying the meaning given to visual images " is constructed in relation to particular methodological and theoretical agendas." Nutbrown (2011:25) suggests knowledge of schemas provides "another way of looking at children" providing a "professional language to refer to children's consistent and persistent patterns of action" (24). It is this professional language that is adopted when viewing and attributing meaning to the photographs. Using the work of Atherton (2013), Nutbrown (2011), Athey (2007) and the many works of Piaget the data was interpreted and analysed, this did not happen as a single event but rather as Pink (2007) implies, as a continuous process. Images were printed out and organised by schematic themes onto large sheets of poster paper. Allowing me to ponder and deliberate, to look forwards and backwards, inwards and outwards to identify the schematic threads and plotlines of the individual stories Clandinin, (2006).

Figure 3.2

Connecting threads

Pink (2007) warns that different people interpret images differently. Within this thesis the views and knowledge the key workers and parents contributed were seen as a positive, sharing the photographic images with parents and key workers initiated deeper understanding providing a greater subjective meaning. Informal weekly meetings were held with key works to discuss the images and posters (Figure 3.2). Home visits provided formal opportunity for parents to contribute. Audio recording of such discussions were transcribed and returned to parents and key workers for approval and alterations, ensuring the "process" of consent was maintained (Etherington 2007). Following on from home visits parents also contributed informally sending photographs, or chatting whilst dropping or collecting their child from nursery.

The new and additional information frequently meant the photographic images were re organised as schematic threads between home and nursery emerged.

Chase (2011) identifies a distinct feature of narrative inquiry "as meaning making through the shaping or ordering of experience" (421). The large posters provided a way of ordering and shaping the images, providing a way of understanding the lived experiences of each participant through a schematic lens.

Whilst I am not physically captured on the images, it is my thoughts and ideas that both direct and drive the research. As I perceive participants schematic threads begin to unfold, my presence becomes more deeply defined within the research process, recording thoughts and reflections in my research journal that subsequently steer the direction of the observations with regards to the images captured. Whilst such interpretations may be considered by Prosser (2011) as my individual perception, I would rather believe like Pinnegar and Daynes (2007:5) that narrative inquiry can be both a "method and phenomena" within the study.

This section has outlined the research questions, identified the aims and positionality of the researcher along with other methodological implications involved within this study. Table's 3.1, 3.2, 3.3 and 3.4 summarise the dates, locations and time the data collection took place

Summary of data collection

Abbey	**Nursery setting**	**Home environment**
24th April	1.30- 4.15	
8th May	9.30 -11.30	
15th May	2.00 – 4.15	
18th May		10.00- 11.15
30th May	9.30 – 11.45	
14th June		Cancelled
6th July		1.30-2.45
12th July	2.00 – 4.30	
Total of 7 data collection sessions	5 data collection sessions	2 data collection sessions

Table 3.1

Abby's data collection period.

Hannah	Nursery setting	Home environment
24th April*	9.30 – 11.30	
3rd May	9.30 -10.30 (no data collected	
12th May	9.15 – 11.30	
23rd May		10.30- 11.30am (no data collected)
30th May	9.30 – 11.45	
21st June		10.30 – 11.45am
27th June	9.30-11.40	
14th July	1.30 - 4.45	
Total of 6 data collection sessions	5 data collection sessions	1 data collection sessions

Table 3.2

Hannah's data collection period

Emily	Nursery setting	Home environment
24th April*	9.30 -11.45	
10th May**	9.30 -11.45	
19th May	9.30 -11.45	
21st May		1.30 – 2.45
23rd June	10.00 – 11.45	
5th July**	9.30 – 11.30	
12th July**	9.30 -11.45	
14th July**	11.00 – 11.30	
22nd August		2.30 – 4.00
Total of 9 data collection sessions	7 data collection sessions	2 data collection sessions

Table 3.3

Emily's data collection period

George	Nursery Setting	Home environment
26th April	9.30 -11.45	
10th May**	9.30 - 11.45	
19th May	9.30 – 11.45	
11th June		2.00 – 3.00
22nd June	9.30 – 11.45	
5th July**	9.30 -11.30	
12th July**	9.30-11.30	
14th July**	9.30-11.30	
18th Aug		2.00- 3.20
Total of 9 data collection sessions	7 data collection sessions	2 data collection sessions

Table 3.4

George's data collection period

* Data collected within same session for Hannah and Emily
** Data collected within same session for Emily and George

The following four chapters will present the individual stories of Abby, Hannah, Emily and George. The narrative story that accompanies the photographic images grew and unfolded over time. The process of capturing the images although often hectic was straightforward; images were captured only when the participants were involved in self-chosen activities. Whilst this could have meant there would be occasions when no data was collected, in reality this happened infrequently (Table 3.2). Meaning as a researcher I experienced little ethical tensions over the need to prioritise my requirements over the needs of the participants.

Initially I attempted to make notes simultaneously to capturing the images on film, however this method was hastily abandoned due to its unmanageability. Instead after each data collection I would sit and reflect, look through the photographs and write down ideas, thoughts and factual explanations to further accompany the photographs. The notes included my musings, my thoughts, perceptions and possible questions as I tried to identify and reflect on the forms of thoughts the children displayed within their daily endeavours. Regular and frequent chats with key workers provided further data that has been included within the narrative story, alongside parental feedback gained during home

visits and whilst sharing the captured images. Frequent and regular jotting in a research diary also provided not only the opportunity of recording and crystallising my thoughts (Pelias, 2011) but also the opportunity to include myself in the research, to become part of the landscape (Silko 1997:27) as Chase (2011) explains sometimes topics can be more fully explored if the researcher is in the research.

Drawing mainly on the work of Atherton (2013); Nutbrown, (2011) Athey, (2007, 1990) and the various works of Piaget (1953, 1959 & 1970) to provide a viable schematic interpretation. Each story will be followed by a discussion identifying the possible developing cognitive patterns as they are revealed through the children's perceptual and physical actions at nursery and home.

The following sections will present four individual case studies, written as narrative stories.

Chapter 4

The process of coming to know: The researcher and her stories

Athey (2007:29) points out "it is worth stating 'intelligence as adaptation to environmental events' may be what the education process is about, but it is difficult to record the process much les to evaluate it" I have chosen to begin this chapter with the words of Athey (2007) to highlight the unchartered path of cognitive development this section seeks to explore.

This chapter presents four children's individual narrative stories together with a discussion and evaluation. It will illustrate how four young children pursue their schema within the nursery setting and home environment. Illuminating through a schematic lens how two- year- old children use both their physicality and engagement across resources and environments to come to know and understand the environment. Through every day experiences both at home and nursery the stories witness how two- year- old children' cognitive development occurs- "intelligence as adaptation to the environmental circumstances" (Elkind, 1969: 319).

Reflecting across the stages from motor level to symbolic play the observations and discussion are used to identifying and demonstrate:

1 What does a two-year-old child's schema look like?
2 How do schemas support individual young children's thinking (cognitive development)?
3 Do schemas translate and transform across different boundaries within a young child's life?
4 How do social and cultural influences influence children's schemas?
5 To what extent does schematic behaviour contribute to young children becoming social actors in their own life?
6 What kind of environment and pedagogy can support children's schematic explorations and development

The observations are presented in a narrative form using a chronological time frame, to exemplify individual children's emerging patterns of thoughts their forms of thinking (Nutbrown 2011).

The following stories (narrative observations), photographs and conversations of four children were collected over a 16 week period of time as I attempted to "come to know" (Atherton 2013.p.3) and gain an insight into their life. All observations of the children both at nursery and home were regularly shared with parents, and the Key worker.

Abby was twenty-two months old, Emily twenty-three months old, Hannah and George were both twenty-nine months old when the observations began.

Initially I will present and discuss Abby's schematic behaviour as she pursues her containing, enveloping and trajectory interests, suggesting how such schemas support Abby's learning as she tries to understand and make sense of the environments she inhabits. Abby's schematic behaviour is evidenced through her physical and sensory actions, her speech and her exploration of mark making.

Hannah will then be introduced, Hannah's motivation, persistence and involvement is evidenced as she systematically fits together relevant experiences revealing her dynamic back and forth, containing and enveloping schemas.

Emily's story her journey between motor level, functional dependency and possible symbolic representation (Athey 2007). Illustrates how through "sensitised" and "discriminating" (Atherton, 2013: 50) selection of content Emily is able to transform materials to better fit her developing forms of thought (Nutbrown 2011); through the use of dynamic back and forth, containing, enveloping and transporting schemas.

The final story to be presented is George's story. His story portrays how through the co ordination and amalgamation of his dynamic trajectory, containing and

enveloping schemas he is able to come to know the world at a higher level. The observations exemplify George's motor level, functional dependency and symbolic play experiences (Athey 2007).

Emily and George's stories both ask the question of the suitability of present day early years education policy.

4.1 Abby's containing, enveloping and dynamic vertical trajectory schemas.

Abby was born on 22nd June 2010 making her 22 months old at the start of the data collection. Abby attended nursery for three full days each week, she had just made the transition from the Explorer room (baby room) to the Tweeny Room (two year old room).
Abby has an older sister who previously attended nursery but now attends a local Primary School. Abby lives at home with her elder sister, Mum and Dad.
On arrival at nursery each morning Abby appeared content and eager, she quickly busied herself in a range of different explorations and activities. Portraying a confidence and determination as she purposefully engaged in her chosen business.

4.2 Narrative observations

Play dough: 'hiding' (24th April; 22months)

When I arrived in the Tweeny Room there were three children in the room. Abby was alone at the play dough table, initially she did not notice me. Her whole focus and concentration appeared to be directed to wards the play dough. It took several minutes before she looked up and around the room; she caught my eye and smiled at me, but did not move from the play dough activity. I took this as my cue, Abby was acknowledging and accepting my presence in the nursery room. I moved a little closer and continued to observe her actions.
She appeared to be fully involved in the task; Abby was moulding and pummelling a large piece of play dough. At times she was pushing with such force that she needed to stand on her tiptoes.

Figure 4.1

Play dough

As I continued to watch I realised that Abby was not using the play dough in the traditional manner to make shapes, but instead pushing the metal shape templates into the play dough, she was covering the templates in play dough.
It did not seem to be an easy task, to push the templates into the centre of the play dough required such force that she had to use both hands and stand on her tiptoes. Abby was able to make the metal templates disappear from view. She seemed very engrossed in this task. Other children came to the table, but she did not seem to notice them. She managed to hide two shape cutters in the play dough.

Next Abby broke off small pieces of play dough and placed them into the palm of her hand. Squeezing together her fingers she closed her hand around the play dough, making the play dough disappear from her view. She repeated this many times. Each time she re opened her fingers and looked at the play dough, she smiled.

Figure 4.2

Holding

Figure 4.3

Hiding

Later that same morning I also observed Abby putting pieces of play dough in and out of other resources, making the play dough disappear and re appear in different ways.

Abby seemed excited and pleased that she could make the play dough appear and disappear. Causing me to wonder, if she could not see it with her own eyes, could she still picture it in her own mind, in her thoughts? Each time it reappeared, did it remain the same?

Discussion

Athey (2007:28) suggests that what is needed is more information about the 'patterns of cognition that children bring to educational situations'. Within this observation Abby seems to be interested in covering and enveloping objects By initially covering the metal templates within the play dough, then by containing and covering the play dough within her hand or a plastic resource, the play dough was ultimately hidden from her visually. This suggests Abby's form of thought is containing and enveloping, which she explores through purposeful interactions with the play dough and accessories. Nutbrown (2011:14) describes this as the 'content', suggesting forms of thought can be 'nourished' if supported with 'suitable content'.

At 22 months of age it can be assumed that Abby's interest is not in the permanence of the objects, but the actions of enclosing and containing. Athey (2007:47) identifies Abby's age range as a period in which children move into

the stage of symbolic functioning, a time that children begin to recognise the relationship between "motor actions and the sensory or perceptual feedback" of their actions. In terms of the above observation of Abby it is difficult to propose what initiated her to contain and envelop the metal template in play dough. This could have initiated as a motor action as she used her physicality to push and pull the play dough and template.

However what can be deduced is Abby's recognition of the relationship between her actions and her visual perception of what happened to the metal template its removal from view as it became contained and enveloped within the play dough. Abby then appears to use this experience to 're-present' the experience with the play dough and her hand. As the play dough is contained and enveloped in her hand it once again is removed from her sight. It appears Abby is able to nourish this form of thought as she continues to explore her conceptual investigation through further content. Such exploration and "experiencing" according to Athey (2007:200), is "the stuff or content of mind".

Athey's (2007:47) definition of operating at a symbolic level requires not only the acknowledgement of the relationship between action and perception, but "internalised actions" leading to a "transformation of either the material or persons". When considering materials and their properties Forman (1994) identifies the different properties of different media, suggesting some materials provide a greater affordance to be transformed. Owing to its malleable properties play dough could be viewed as such a material if used by a child who desires to make symbols. Atherton (2013) compares Athey's (2007) use of 'content' and 'match' to Forman's (1994) use of 'media and affordance'.

Abby's use of the play dough appears not to be at a symbolic level. Her actions and thoughts appear focused on the transformation of use, rather than her intention to actually to transform the play dough into something else

Water: 'filling' (8th May; 23 months old)

Abby and three other children were busy in the out door area wearing raincoats and Wellington boots making puddles and stamping in them. I used my digital camera to take photographs, which I shared with the children. After a short time Abby seemed to loose interest in my camera, and me moving to the water butt to follow her own interests. On this occasion my observations of Abby were regularly disrupted as the other children would come and stand in front of me smiling and pointing to the camera.

Abby moved towards the water play, looking in the box for several moments before carefully selecting a cup and a plate. She proceeded to fill the cup with water. Once the cup was filled to her satisfaction and taking great care not to spill the water Abby moved across the outdoor area to the house area. Here she placed the plate flat down and, with great concentration, poured the water on to the plate.

Figure 4.4
Emptying water

Abby took no notice of the other children, her whole focus and concentration seemed directed towards the important task of emptying the water from the cup on to the plate.

Skilfully Abby continued pouring the water out until the plate was completely covered by the water. After pausing for a few moments Abby carefully and precisely laid the cup on its side in the centre of the plate

Figure 4.5

Covering

Although I was unable to know Abby's precise thoughts, I did wonder if she was surprised that the water did not cover the sides of the cup more fully. I think perhaps the fascination and interest came from the fact that she could still see the cup, even when it was under the water.

Next Abby placed a hand into the water. Abby spent a long time exploring what happened when she placed her hand onto the plate and into the water.

Figure 4.6

Hand in water

Initially placing one hand at a time, Abby repeated this action many times. After a while Abby started to place two hands together on the plate, causing the water to spill from the plate. Abby repeated this exploration many times dutifully re filling the plate with water.

Abby's level of persistence and concentration surprised me; she had gone from laughing and playing with the other children to a noticeably deep level of interest and involvement that continued for many minutes. What was it about this activity? Previously I had observed her covering an object in play dough. Was this a continuing thread of thought? Was she continuing to explore an enveloping schema, only this time using water and her hands as opposed to the play dough? In future observations I will look out to see what other materials Abby covers and envelops with.

Discussion

Nutbrown (2011) acknowledges that some adults may find it difficult to believe that at only 23 months of age Abby has an ability to consciously select resources to meet a specific preknown criterion, her interest, her form of thought. Yet Bruce (2005:65) pointed out "children's schemas seem to make children alert to certain events and properties of objects in the environment". With regard to resources Nutbrown (2011:39) highlights the importance of consistency of resources within a nursery setting: "children can get on with the business of learning when they are not encumbered with such worries as how to find things'. Abby displayed no hesitation in her industrious endeavours; she selected her chosen resources with purposeful ease, even after I had possibly interrupted her train of thought, Abby continued to nourish her schematic interest of containing and enveloping (*form*) using the medium of water (*content*).

Forman (1994) suggested that thoughts could be influenced by the different properties of a material. Understanding that water is transparent could be a driving force within Abby's exploration. She places the cup and then her hand within the water and both remain visible, in contrast to her previous experience with the play dough. If this were the sole focus, Athey (2007) would identify the activity at a motor sensory level. Abby's sustained actions, her pondering, and her repeated interests, leads me to believe she has a deeper, more complex understanding.

Piaget (1953) supports the view that a child's schema is continually modified through the engagement of activities and the accommodation of new experiences. Suggests children form links in their thinking between something they do and a further action. Placing the cup in the water caused the water to move and envelop the sides of the cup; placing her hand in the water also displaced the water, so covering her hand. If Abby understood this relationship Athey (2007:142) would identify this as a "functionally dependent relationship". Covering her hands with water is dependent on there being enough water on the plate; this is supported through Abby's actions of continuously refilling the plate with water. Through further practice and experience Abby continued to prove and disprove her ideas of causal connection between the amount of water and her hand. These ideas being developed through Abby's own experiences highlighting her as an actor in her own learning.

Movement: 'trajectory'

(15th May; 23 months old)

It was mid morning, Abby appeared full of beans and very energetic. First I watched as she balanced on the edge of the sand tray, walking very slowly, Abby used her arms stretched out to the sides to help with her balance. After a few practices Abby was able to run along, no longer needing to use her arms to balance. Although Abby seemed to be deeply involved when I her reminded to "go steady' she smiled at me and replied 'I steady, I go steady, I not fall".

Figure 4.7

Balancing

Figure 4.8

Down the slide

Figure 4.9
Walking

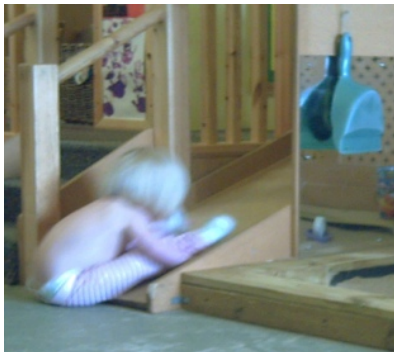

Figure 4.10
Backwards

Next Abby moved to the slide, seeming to explore the different ways to come down. Sliding on her bottom, marching down, jumping down, and even coming down backwards. As Abby explored the up and down movement on the slide she continued to inform me "I steady down, I high, I not fall… I down, down, down."

Abby's interest in the slide persisted I had not seen such physicality before. It was as if she was trying to explore how and what the different movements felt like. First the horizontal balancing movement, then the vertical drop of the slide. Perhaps the vertical movement provided greater interest, possibly explaining why she explored this through different body movements. I observed Abby's continuing actions for over twelve minutes when I then became distracted and involved with another child.

Abby moved to the outdoors, where she quickly became engrossed with exploring the water

Figure 4.11
Jug to bowl

Figure 4.12
Trajectory lines

From all the resources available Abby took her time carefully selecting a large bowl and a measuring jug. Filling the jug, she repeatedly poured the water from the jug into the bowl. Her involvement was so intense that she seemed not to even notice the two children who came to join in with the water play, Abby did not acknowledge or speak with them.
Initially I kept my distance, trying not to interrupt, or become involved in the play. Observing Abby's facial expressions she seemed fully absorbed and fascinated with this activity. The movement and flow of water as it travelled from the jug to the bowl seemed to be the sole focus of Abby's interest.
Once the jug was empty Abby quickly bent down and scooped up more water into the jug and repeated the activity. I moved closer and spoke to Abby "the water is flowing, the water is falling… Abby is pouring the water… the water goes down". Abby made no response, but continued to focus on the flow of water.

I began to wonder if Abby was making links between the movements she had experienced with her body earlier in the morning? Abby had felt the vertical movement of her body down the slide, is she now able to see this with the water. As the water flows it provides a visual representation of the vertical trajectory she herself experienced. I also wonder if she is partly interested in filling the bowl with water, containing the water in the bowl. Or is it the vertical movement of the water as it creeps up the side of the containers that is her main interest today?

Abby's involvement with the activity was eventually interrupted by the lunchtime routine, however she did not seem unduly disturbed by this. Perhaps she was hungry? Or perhaps she understood she would be able to return to her explorations after lunch.

Discussion

Athey (2007:116) describes the interest in vertical ascents or descents as a "dynamic vertical schema". Abby's interest moved beyond simply experiencing the descent; she used her full body and several different body parts to increase her perception of this movement. This resonates with the definition of schema by Johnson (1987:19) who focuses on "embodied patterns" with this he infers to

both bodily movements and perceptual interactions gained through meaningfully organized experiences. In other words, bodily perception and movement increase an individual's understanding of an experience. If Abby's desire was to increase her perceptual understanding of a descent, she recognised that a deeper understanding would be gained through using a range of bodily movements, reinforcing Neisser's suggestion (1976:56) that "schema is a pattern of action as well as a pattern for action".

Neisser (1976:55) considers perception to be an active process; thereby Abby chooses what she wishes to perceive (see/feel). The information she gains from the environment is fitted within her schema (cognitive frame). Athey (2007) reminds us that schemas exist in a continuum from motor action to thought. Implying through her embodied patterns of perception, Abby has gained physical experience of a dynamic vertical schema, so it makes sense that she builds upon this knowledge to further nourish her form of thinking. In purposefully selecting the water she gains a visual perception of a trajectory vertical descent. Whilst it is not possible to know Abby's thoughts it appears Abby has developed a perceptual plan to nourish her vertical trajectory interest. Atherton (2013:42) writes that Athey's 'content' and 'match' are arguably similar to what Forman's calls 'media' and 'affordance'. Abby appears to recognise the affordance or match of the content and media available within the nursery environment to pursue her form of thinking – a dynamic vertical trajectory.
Athey (2007:117) explains that "when 2-year-olds experience a vertical ascent, such as climbing, followed by a vertical descent, such as jumping, sliding or rolling, they experience asymmetry of effort", meaning that an unreciprocal relationship is developed between ascent and descent. This suggests that at this moment Abby's interest is in the vertical descent.

Athey (2007:168) states that "two-word utterances are ambiguous", suggesting "ambiguities" decrease as "speech increases". Whilst Abby used language during this observation, its context is not fully understood. If Abby's intention was to use the word 'down' to suggest she is Incy Wincy spider coming *down*, or the mouse that runs *down* the clock Hickory Dickory Dock she would be

transforming herself and subsequently operating at a symbolic representation level (Athey, 2007). However, such a presumption would be inaccurate and flawed. In response it will be anticipated that the purpose of Abby's language was not as a social tool but to "accompany" and "reinforce" her bodily movements (Piaget 1959:17), thereby suggesting this to be a motor level activity.

Toys: 'covering' (18th May; 23 months)

Abby is at home with her Mum and older sister. Abby and her sister take me into their playroom, to show me where they keep their toys. Abby and her sister sit on the floor to have a drink and a biscuit, I use my digital camera to take a picture of Abby eating a biscuit, I shared it with her, she smiled and said 'It's Abby'. I take this as my cue that it is ok to use my camera.

Abby empties the box of instruments on to the floor. Abby's Mum tells me she often empties the toys on to the floor, and then proceeds to play with the empty boxes. Abby seems happy and relaxed with my presence in her playroom, she consistently turns to look and smile at me, whilst repeating my name "Julie here".

Figure 4.13
Instrument

Figure 4.14
Empty box

To play the instruments Abby sits in a tiny space with the instruments spread all over her legs.

Figure 4.15

Instruments covering

Figure 4.16

Jigsaw covering

Abby does a similar thing with a jigsaw puzzle. Opening the box she tips all the pieces over her legs, she then wiggles her legs around so the pieces fall between each leg. It reminds me of how she enveloped her hands in water at nursery. Is Abby using her legs and toys to explore her enveloping interest? When she tips the toys over her legs – does this make her legs disappear from view? Can she still see the toys, but not her legs, do her legs reappear when she shakes the toys away.

Figure 4.17

Head inside

Figure 4.18

Walking

Abby's attention soon turns to the empty toy box, she seems to enjoy playing a game of pee-po with the box, lifting it up and down:

Researcher: I can see you, I can see Abby – oh where has Abby gone? Oh, you are inside the box?

Putting the box over her head Abby begins to walk around the playroom:

Abby: See me, see me, see Abby.

Researcher: No, I can't see Abby, where is she?

I think Abby enjoys this game as she return to it many times

Abby spends time and concentration to make sure she completely contains all her snuggle cloth inside the pink bag. It seems to be a rather tricky job, Abby has to hold the pink bag in her right hand and push the cloth in with left hand. Her facial expressions demonstrate the level of concentration and effort required.

Figure 4.19
Cloth in

Figure 4.20
Cloth out

Once the cloth is completely hidden in the bag, surprisingly Abby takes it straight out again. Abby can make the cloth disappear and reappear.
The connection between the two activities implies a containing interest. Initially in containing herself (head) inside the plastic box, and holding the box over her head and eyes meant she could no longer see me; then when she lifted the box up I once again became visible. Suggesting Abby is possibly using the toy box and her interest in containing to further explore the concept of appearance and disappearance. It is feasible she extends this concept to explore making the cloth appear and disappear. Did she realise when she contained the cloth inside the bag she would no longer be able to see it? It had gone, to make it reappear she had to pull it out from inside the bag.

Discussion

Ten days earlier in the month (8th May) Abby had been observed in nursery enveloping and containing with play dough and water. On this occasion the relationship between the ability to cover her hand and the quantity of water

were acknowledged and recognised. It seems through further practice and experiences at home Abby continues to prove or disprove her ideas of causal connection between *content* and her *form* of thinking. Nutbrown (2011:46) verifies, "children's persistent threads… involve children [in] creating their own continuities… Viewed in this way, schemas can be considered at the core of children's developing minds".

Piaget and Inhelder (1956) identify a child's ability to move freely in thought, which develops gradually and slowly as the child depends less on action and perception and draws from their thoughts. An example of this is the child's ability to see events happening outside of themselves. Piaget and Inhelder (1956) explored the development of perspectives of space. Initially children are fixed within their own perspective, unable to manipulate their thoughts. Believing her perspective is the only perspective; Abby's experience within the red box demonstrates her inability at this time to manipulate her thoughts. Her use of language demonstrates her understanding of being *in* the box. With her head and her eyes contained within the box, her visual perspective is very limited: she is unable to see me, and therefore believes I cannot see her either. At this point she is unable to manipulate her thoughts her mental images away from her own position of being *in* the box. She therefore believes that as she can no longer focus on the room, no one else can. Nutbrown (2011:46) corroborates that within "apparently unconnected activity [children] sometimes find (and understand) important cognitive links". Whilst it is not possible to perceive fully Abby's thinking, it could be presumed that the *disappearance* of the white cloth within the bag further confirms Abby's belief in her own perception of the world; objects contained inside materials can no longer be visually viewed.

Water and toys: 'Symbolic thoughts' (30th May – 24Months)

When I arrived in the Tweeny Room Abby was already in the outdoor area engrossed in her endeavours. I watched with great interest as Abby proceeded to tip the water from container to container. I smile and said hello, but Abby did not notice me this morning. Instead her effort was focused on tipping water from the cup, to the bowl, then into the large yellow tub.

Figure 4.21

In water

Figure 4.22

Containing water

Perhaps it is the insideness of the containers that attracts Abby's interests today, more specifically, how the water fills the containers. After filling and emptying the bowl and cup a few more times Abby takes the cup and bowl to the house area.

Figure 4.23

On top

Figure 4.24

Filling bowl

Carefully Abby placed the bowl on top of the plate, and then continued to fill the bowl with water. When the water was used up, Abby returned to the water butt to collect more water. Abby continued to fill the bowl with water; once it was full I spoke again to Abby:

Researcher: It's full of water.

Abby: More water, full… full…

Researcher: Full to the top.

Abby: Full to the top.

Using the table with a flat surface appeared to make it easier for Abby to accurately fill the bowl. Having the bowl on a flat surface enables Abby to completely fill it to the brim, with no spills. Today the focus of Abby's enterprises seems to be filling containers.

Later in the morning Abby was in the sand pit, filling pots with sand. Abby makes regular visits to the beach; her family has a beach hut.

Figure 4.25
Sand pit

Figure 4.26
Containing sand

Figure 4.27
More containing

Whilst it is not possible to know Abby's actual thoughts I imagine she maybe remembering being on the beach with her Mum, being shown how to make a sandcastle. Abby appears to understand the relationship between the sand contained within the pot and the completed sand castle: the castle is functionally dependent on the sand.

Abby moves indoors to the home corner. Filling plates with play food. Abby piles the plate full of play food, then takes it to the sitting area and pretends to eat it, even putting it in her mouth.

Abby: I eat… eat all gone. (Places food in mouth.)

Researcher: Abby having her lunch.

Abby: Eat pizza… eat… all gone. (Abby offers food to me.)

Figure 4.28
Food

Figure 4.29
Carrying

Figure 4.30
Eating

This morning the content of Abby's endeavours look very different, whilst the form is consistent. Her explorations have involved many aspects of a containing schema, containing water, containing sand, and now containing pretend food on a plate and in her mouth.

Discussion

Piaget and Inhelder (1969:55) suggest imitation constitutes both sensory motor level and representation, suggesting imitation can take place "in physical acts but not yet in thought". Piaget (1950) considers imitation as an accommodation to external models, in contrast to assimilating information to meet the needs of oneself, believing intelligence to comprise equilibrium between assimilation and accommodation.

Sensitive adults and a suitable environment (Atherton, 2013; Nutbrown, 2011; Mead and Cubey, 2008 and Athey, 2007) have continued to support Abby's continued interest in containing and enveloping, to the point that she is

beginning to move on from imitating; she is beginning to assimilate and accommodate real life situations into her schematic motivations.

Abby's initial conversation whilst involved with the water could easily be deemed as imitation:
Researcher: It's full of water.
Abby: More water, full… full.
Researcher: Full to the top.
Abby: Full to the top.

It is not possible to know if the speech Abby uses comes from her own thoughts. It is a possibility that Abby is simply imitating and repeating the words. The words suggested match Abby's actions so it may be that Abby has some appreciation of these words, so feels it is appropriate to repeat and imitate them. Abby's explorations with the sand could also be perceived in this way, Abby is repeating and imitating previous physical activities.

Conversely, within the home corner it could be suggested that Abby moves to a symbolic level, assimilating "reality to self" (Piaget and Inhelder 1969: 58), demonstrating her transition from representation of action to representation of thought. Accompanied by words (symbols) Abby uses her containing and enveloping schema to recreate her experiences of meal times. Abby not only recognises the plastic resources as food but uses it in a suitable context as real food, suggesting within her thoughts she is able to transforms plastic resources into real food, accompanied by appropriate social language to play a mealtime scenario. Thus suggests Abby's developing use of language is associated with her forms of thought.
Abby: I eat… eat all gone. (Places 'food' in mouth.)
Researcher: Abby having her lunch.
Abby: Eat pizza… eat…all gone. (Abby offers 'food' to me.)

Atherton (2013:64) also believes young children's language can be further supported through a "dialogue of conceptual correspondence" rather than through abstract ideas such as "castles and princesses".

Containing: 'Insideness' (6th July: 25 months)

Unlike my last visit to Abby's home, today Abby chooses to stay very close to her Mum. I take this to mean that Abby is unsure about my presence and her role within my research, I feel and try to respect that Abby is withholding her consent. Abby is not agreeing to be a participant in my research at this moment in time. I try not to invade her space, I try to step back and become a quiet observer, giving both Abby and her sister equal attention.

Time passes, Abby becomes involved in playing a game with her sister and her Mum, she appears to relax, twice she catches my eye and smiles at me. When her sister asks me to take a photograph, Abby also moves into the frame, I take this as Abby's continuing informed consent to participate.

Abby is very busy playing a game with her sister and her Mum. The game involves catching butterflies with a net as they come flying out of the elephant's trunk. It is very tricky to catch the butterflies, as they come out very quickly.

Figure 4.31
Catching 'butterflies'

Figure 4.32
Playing again

Abby's Mum provides lots of encouragement:
Mother: Can you catch them… get some Abbs… look, catch them when they come down… good girl, Abbs.
Abby seems to find it fun and amusing, she frequently chuckles and smiles.

Rather than running around like her sister to catch the butterflies, Abby sits on the floor and lets the butterflies fall on to her. She seems to enjoy collecting the butterflies that have settled on and around her. Abby seems to enjoy watching the butterflies float down to the floor. Abby conscientiously collects the butterflies from the floor and places them into her net. Abby seems to be having real fun, playing with her Mum and sister.
Abby: Look, look.
Abby: Got one… got one… some more come.
Researcher: Have you got them all… Abby is your net full?

When Abby and her sister have collected all of the butterflies, they put them into the elephant's trunk (game) and the game is ready to begin again. After several games Abby found another interesting way to use the net.

Figure 4.33
Inside net

Abby: Look at me, me Abby.
Previously I had observed Abby place the plastic boxes over her head; today it is the net. I wonder did Abby realised she would be able to see through the net. She could

see though the net to see the butterflies inside the net, suggesting she too would be able to see through the net.

Since I last came to visit, Abby has a new toy in the garden.
Abby: I want to go on my trampoline… I go on trampoline and swing.

Figure 4.34
Trampoline

Figure 4.35
Big jumps

Abby looks very confident on the trampoline, she jumps and bounces, up and down, up and down. Seeming to really enjoy it.

Figure 4.36
The swing

Abby also enjoys her swing, she goes very high when her Mum pushes her.
Abby: High Mummy…high Mummy… high, high …high, high.

Discussion

Gardner (1984:129) reminds us "logical science and mathematics can be found in the simple actions of young children upon the physical objects in the world". Nutbrown (2011:46) asserts children's threads of thinking, "connect different areas of content" In Abby's situations such content is found within both her home and nursery environment. Her play environments provide opportunities for her continuity of thought as she matches various content to her form of thinking.

Abby's use of the fabric net provides her with an entirely different experience, a new set of ideas to be assimilated and accommodated into her form of thinking. The ability of practitioners, to identify children's own constructions of reality is compared by Nutbrown (2011:46) with "unlocking a door, shining light on previously darkened areas, seeing anew".

Abby's endeavours continue to build on her previous experiences and expertise, as Garner (1984:129) observes, the "chain is long and complex, but it need not be mysterious". Athey (2007) would perhaps categorise today's exploits at a sensory motor level. Abby's actions serve as a reminder that "sensory motor activity constitutes the foundation of symbolism and representation" (Piaget 1959:283). As Athey (2007:51) states, "What is 'known' leads to what becomes 'better known' ".

Dynamic action: 'representation' (12th July: 25 months)

Abby is in the outdoor area, she selected a book then proceeded to ask the adult (practitioner) to read it.

Abby: This one… this one Toffee.

Practitioner: You like listening to the adventures of Toffee.

Abby: I like Toffee… read me.

Figure 4.37

The story

Abby appears very focused, concentrating on the pictures as the story is read aloud to herself and another child. Seeming to recognise the characters in the story. Abby listened to the story a few times, before her interest and focus is re directed towards a piece of blue chalk.

Initially I did not understand what Abby was doing with the chalk. I observed the blue mark on the ground; Abby was already very busy using the chalk to make another mark on the ground. This is the first time I have observed Abby drawing.

Figure 4.38

Blue mark

Figure 4.39

Another mark

I stayed close and observed. I did not try to talk with Abby or disturb her concentration. I wanted to understand what it was that made her so purposeful in the task. The marks on the floor were all similar in shape. Although I could not see Abby's face, from the stillness of her body I understood she was absorbed and engrossed in the drawing, the amount of effort suggested it was more than a simple and random scribble. I continued to watch. It was not long before Abby's attention was re directed from the floor to the blackboard on the wall.

Figure 4.40
The board

Figure 4.41
Pondering

I wanted to see exactly what was the focus of this obvious concentration. I moved closer, but took care not to disturb or distract Abby. Each mark was made in an identical way, a top to bottom vertical movement about 5cm in length.
Was this meticulous precision, or coincidence?

Figure 4.42
Vertical marks

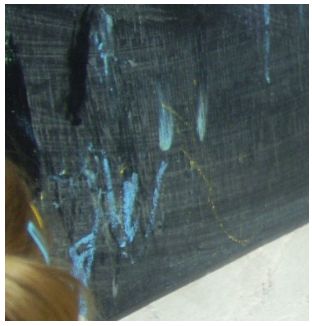

Figure 4.43
Finally

The marks were near the lower edge and in the centre of the board. Each mark was made with an identical arm and wrist movement, from top to bottom. Abby was able to make several marks very quickly, almost with ease.
Later in the morning, Abby returned to do more drawings on the chalkboard, this time with a paintbrush, dipped in water. Reaching and stretching to the top of the board, using the same downward vertical movement, Abby continued to pursue her interest. The marks that appeared this time were longer and wider.

Figure 4.44
Returning

Figure 4.45
Paintbrush

Figure 4.46
Vertical strokes

Figure 4.47
Stretching high

Abby seemed to have a definite purpose, causing me to question are these marks or is it a drawing?

Other children came to join in. Soon four children were stood separately in a row all using paint brushes and water to make marks on the board. Abby's involvement and fascination with this activity led her to completely cover an area of the board with vertical marks, enveloping the blue chalk marks she had previously made with the water.

I cannot presume to know what she was thinking. However, as I come to know her better, I feel able to make suggestions regarding Abby's possible lines of thinking. It is possible through the experiences of sharing books Abby is beginning to understand the use of marks, pictures and symbols to represent ideas. Could the marks on the board be Toffee the cat as he gets stuck on the tall wall during the night? Were you telling the story, your favourite story? Not presuming to understand Abby's thoughts, I suggest the presence of a trajectory link with Toffee the cat, as he climbs up and down the trees and the high walls of his back garden,

could this also be related to the physical experiences from your trampoline, swing and the nursery slide.

Discussion

Athey (2007:78) states, "most early marks are figurative outcomes of bodily movements" This resonates with Atherton's (2013) observation of Henry's dynamic vertical schematic activities and his subsequent mark making. Atherton (2013:74) summarises: "he demonstrated a perceptual correspondence to *form* in his mark making using a variety of materials and tools which were synchronic with his dynamic actions". This is suggesting that Henry was able replay the movement patterns in his mind and represent them as figurative marks.

Abby's forms of thinking (her vertical trajectory interest) over the previous 16 weeks have manifested themselves through her actions of coming down slides, watching butterflies fall, bouncing on trampolines, and pouring water. Without more information it is not possible to propose *exactly* what Abby's figurative marks represent. Nevertheless drawing from the work of Atherton (2013), Nutbrown (2011), Mead and Cubey (2008), and Athey (2007) it can be assumed the figurative marks represent a form of Abby's vertical trajectory schema, a 'thread' of her thinking.

Abby's spontaneous transition "from action to graphic [al]" representation (Athey 2007:78) suggests further evidence of a perceptual plan as Abby continues her schematic journey along the continuum from motor action to thought.

Final thoughts

In this chapter I have tried to illustrate what a two-year- old child's schema looks like. Through on going observations of Abby's self initiated play containing, enveloping and vertical dynamic trajectory schemas are identified. Illustrating how fascinations and purposeful interactions drive Abby's interest and subsequently her cognitive development.

Abby is the youngest participant, yet at only 24months she is able to consciously select resources to further nourish her forms of thought. As Abby's journey unfolds it affords an opportunity to witness the initiation and continuation of her perceptual plan, a perceptual plan that provides evidence of Abby's developing "patterns of cognition" (Athey 2007: 28), and highlights her as an actor in her own learning.

The sequence of observation provide an opportunity to unpick and piece together Abby's patterns of cognition, a skill Athey (2007) believes is important if we are to further understand how young children learn. Athey (2007) and Nutbrown (2011) believe such pedagogical implications should be the driving force when developing curricula for young children.

Abby's story supports Neisser (1976: 56) belief that "schema is a pattern of action as well as a pattern for action." Abby's daily endeavours both at home and nursery provide her with constant opportunities to further explore her vertical dynamic trajectory schema. In nursery Abby uses her whole bodily movements to increase her internalized perceptions (15th May) of a vertical dynamic trajectory schema, Abby continues to test and re test this knowledge at home on her trampoline (6th July). Athey's (2007:78) believes such bodily movement can lead to early mark making, suggesting the marks provide a figurative representation. Wood and Hall (2011) believe the links between play and drawing are frequently misunderstood within educational settings, they feel "educators need deep understanding of children's play, and the processes that link play and drawing" (280). Whilst it is not possible to be certain, it would seem that Abby continued exploration of her vertical bodily movements alongside other vertical dynamic trajectory exploits at home and in nursery

provided Abby with the foundations for her early drawing and mark making activities.

Over the sixteen weeks my observations have provided a window into Abby's life and learning while at home and nursery, and has allowed a deeper understanding of Abby's cognitive patterns, her schemas. Identifying how schema transform and translate across the boundaries of her life, how these patterns of actions drive and support her learning

This chapter has illustrated Abby's intrinsic motivation to pursue her containing, enveloping and dynamic vertical trajectory schemas through her everyday experiences. The detailed analysis highlights and identifies the subtlety of her learning encounters as she endeavours to explore and make sense of the world she lives in.
In the next chapter Hannah's story will be told, highlighting her interests in dynamic back and forth, containing and enveloping schemas

Chapter 5 Hannah

5.1 Hannah's dynamic back and forth, containing and enveloping schemas

Hannah was born on 22nd November 2009, making her 29 months old at the start of the data collection process. Hannah attends nursery for two half-day sessions each week. Hannah is the youngest and only girl in her family and lives at home with two elder brothers, as well as her mother and father. Hannah's mother spends time at the start and finish of each session chatting with Hannah's key worker.

From the moment Hannah arrives at nursery each day, she has a positive sense of purpose about her. Immediately after hanging up her coat and bag she sets to work on her endeavours for the day. Hannah reveals a sense of confidence and a happy, cheerful disposition as she goes about her day-to-day business. Hannah seems to understand that she only has a limited time at nursery; she seems intent to make the most of every moment.

5.2 Narrative observations

Outdoors: 'honey-bee' (24th April - 29months)

Hannah was already very busy when I spotted her in the outdoor area. She was wearing her nursery coat and wellington boots. Kerry (key worker) told me that Hannah had put these on all by herself this morning.

I tried not to get in Hannah's way, as she seemed very busy and involved in her explorations. I found it physically difficult to keep up with her, as she continually moved from one activity to the next around the outdoor area.

I observed and took photographs as she proceeded to water the plants.

Figure 5.1

Watering

Hannah marched around and around the outdoor area many times; sometimes with her arms folded, other times with her arms swinging by her side.

Figure 5.2

Marching

I observed, as Hannah tipped and poured the water. She repeated and explored this many times.

Figure 5.3

Tipping

I observed, as Hannah scooted back and forth and up and down the outdoor area. At times she did this on one leg and demonstrating her developed sense of balance.

Figure 5.4

Scooting

Hannah appeared to be very busy, always involved in a different activity. Observing Hannah was at times very demanding and somewhat difficult. Hannah seemed to move from activity to activity, never seeming to focus on one particular thing. What I found most striking was her continual physical activity; her absence of pondering or wondering.

Every time I looked it felt like that she had moved on to the next task. Over a 45-minute period, Hannah displayed involvement across a wide variety of different activities and interests.

When all of the other children went to get ready for lunch, Hannah began to help Kerry (key worker) with tidying up.

Figure 5.5

Tidying

Kerry asked Hannah to collect the balls. Hannah searched and found the balls in many places around the outdoor area. Instead of placing the balls in the basket, Hannah had a better idea.

Figure 5.6

A row

Figure 5.7

More balls

One by one Hannah rolled the balls down the guttering. The first ball snagged on a piece of wood (figure 5.6), causing the other balls to stack up in a row. Hannah appeared intrigued. She searched and found more balls.

Figure 5.8

Watching

Figure 5.9

Extending

One by one Hannah rolled the balls down the guttering, watching intently as each ball moved along the guttering and came to rest. Her concentration appeared intense. Hannah's whole demeanour changed. Suddenly she became captivated and completely engrossed in this activity. It only lasted a couple of minutes, but for those few minutes I felt I came to know her a little.

Collecting more balls, Hannah continued to add another ball, letting it roll down the guttering, and increasing the row of balls.

I believe Hannah understood how to make the row longer, and how to extend the shape the balls made.

Figure 5.10

Examining

Hannah seemed to stop and spend a few moments looking and pointing at the balls. I could not hear Hannah's murmurs, should I have intervened and questioned? Kerry (key worker) later explained Hannah likes to line up objects and count them and to sing counting songs using numbers up to ten.

Discussion

When considering young children's cognitive development, Nutbrown (2011) describes schemas as being at the "core" of such development. Suggesting schemas provide the "fundamental elements… for the process of learning"(46). According to Atherton (2013:26), looking closely at what children are doing can provide "insightful views of the subtle, complex details of children's schematic behaviour revealed in their own actions, speech and representations."

When discussing observation as a research tool, Clough and Nutbrown (2007: 48) introduce the term "radical looking," suggesting "this is an exploration, which makes the familiar strange." Observing young children's activities through a schematic lens provides the opportunity to make the "familiar strange." Rather than focusing on the *content*, the observer must identify the *form of thought*. Athey (2007:66) warns, "focusing on 'content' at the expense of 'form' can lead to the conclusion that young children…are unsystematic or even idiosyncratic."

Reflecting on the content of Hannah's play, could suggest that she flits from one activity to another - watering plants, walking around, tipping water, scooting and rolling balls. In contrast, when attempting to make the familiar strange, focusing on Hannah's actions could begin to reveal her underlying form of thought. Tipping water and watering plants possibly reveals a vertical trajectory; walking scooting and rolling balls suggests a horizontal trajectory interest. Far from flitting from activity to activity, Nutbrown (2011:67) identifies that such actions, suggest children are "systematically fitting together relevant experiences." Meade and Cubey (2008:38) use the metaphor of a honey-bee to describe how children can be observed as they move from activity to activity, collecting experiences to nourish their schemas and starting to make sense of "abstract characteristics of particular features of their environment." Atherton (2013:50) describes the selection of content to match a form of thought as "discriminating," suggesting that as young children follow their fascinations they are "sensitised" to the environment. Atherton supports Nutbrown' s (2011) belief that through

the processes of exploring, thinking and learning, young children are able to identify their own continuities.

Hannah's fascination with the horizontal was highlighted as she began to tidy up the balls. Placing a ball, one at a time, in the guttering, enabled her to observe the ball as it rolled away form her. It is impossible to know, but perhaps due to the blockage (Figure 5.6), Hannah encountered a new experience. On previous days the balls would have rolled freely and would have possibly bounced off at the end of the guttering. The blockage afforded Hannah with a new opportunity. In this moment Hannah is interested in the spatial configuration of the balls as they line up on the guttering, described by Inhelder and Piaget (1964:18) as a "graphic collection." Atherton (2013:49) warns that when children line up objects, the "dynamic aspect…could easily be missed." Whilst it is not possible to fully understand it seems the movement of the balls together with the formation of the arrangement, as well as the adding of another ball to extend the arrangement motivated and fascinated Hannah's curiosity and her form of thought on this occasion. Athey (2007:114) explains, "drawings, paintings and models represent both configuration and movement." This suggests that in this episode the spatial configuration of the balls (figure 5.10) also represents the sequence of movement required to produce the line of balls for Hannah.

Nutbrown (2011:68) explains that functional dependency can be understood as "simple cause-and-effect relationships." Hannah appears to demonstrate an understanding of cause and effect. In order to increase the row, more balls need to be added, meaning this could be categorised at a functional dependency level (Athey, 2007).

Athey (2007:164) confirms her belief that language and thought develop independently, but reiterates the existence of a match between "forms of thought and appropriate speech." Using number names to 'count' the balls would demonstrate a match between Hannah's forms of thought and her speech, whilst both her key worker and mother suggest that Hannah can frequently be heard

using number names as she counts rows and lines of objects. Unfortunately on this occasion it was not possible to hear Hannah's speech.

Indoors, Outdoors: 'spatial Orientation' (12th May - 30 months)

Hannah calmly sat down to put on her wellington boots. Without any prompting she also put her own shoes on the shelf.

Figure 5.11
Boots on

Figure 5.12
Shoes away

Hannah chose a raincoat and made her way to the outdoor area.

Figure 5.13
Driving car

I kept my distance as I observed. Hannah appeared to skilfully drive a play-car around the outdoor area. Kerry (key worker) explained that Hannah could go very fast, but that she always took care not to bump into the younger children.

Figure 5.14

Pouring water

Hannah's focus quickly turned to the water, spending time pouring and tipping water from a watering can into a large bowl.

Figure 5.15

Sprays

Figure 5.16

Streams

I wondered if her interest lay in the patterns and shapes the water made?
When the water came out through the nozzle it made a spraying pattern. When the watering can was tipped further, the water came out in one large stream from the hole in the top, making a different shape and pattern.

It was not long before her interest moved on.

Figure 5.17

Toys in bowl

Figure 5.18

Toys covered

Hannah placed small objects into the bowl and proceeded to cover the objects with water. Systematically Hannah ladled water from the yellow container, until the objects in the bowl were immersed and covered by the water.

Figure 5.19

More toys

Hannah appeared unconcerned when other children joined in and added more objects to the bowl (figure 5.19).

Once the object was immersed Hannah's interest moved on.

Riding a bike, Hannah confidently travelled backwards and forwards over the bridge, stopping only to put on a bike helmet.

Figure 5.20

Backwards over

Figure 5.21

Forwards over

After several trips back and forth across the bridge, Hannah cycled to the sand pit. Here she quickly filled a plant pot with sand, before continuing her journey around the perimeter of the outdoor area.

Figure 5.22

Over

Figure 5.23

Past

Figure 5.24

Around

Hannah seemed very active, always on the move, and at times it was difficult to follow her play, to recognise her interests, to understand her fascinations, and to come to know her.

Hannah returned indoors. After changing from the wellingtons to her own shoes, she spotted the large tray of rice.

Figure 5.25
Filling cups

Figure 5.26
Containing rice

Hannah began to scoop the rice to tip, fill, empty, and contain it within a variety of available containers.

Figure 5.27
Tipping rice

Figure 5.28
Scooping rice

Hannah appeared to be comfortable to accept me in her play. I began filling and emptying containers with rice. Hannah did not speak with me, but from time to time glanced up to observe what I was doing. Hannah began to sing and hum, unfortunately I was unable to make out the words or the tune. Hannah arranged the containers in a row.

Figure 5.29

Counting

Hannah- Three, I count one, two, three.

Researcher- Yes you have three, three containers full of rice.

Hannah – I go, I finish, you come

Researcher – Yes I can come, where are we going.

Hannah- Slide, I go on slide.

Figure 5.30

Coming down

I counted as she moved down the slide ten times, together we counted to ten. The interconnectedness and the continual flow of activities make it difficult at times to follow Hannah. Yet her endeavours and back and forth movements suggest possible patterns of, containing and trajectory schema.

Discussion

In "systematically fitting together relevant experiences" (Nutbrown 2011:67), Hannah productively merges behaviour related to a number of schemas into a continuous flow of exploration and investigation.

- The horizontal back and forth of the car.
- The dynamic vertical interest in the water.
- The containing and envelopment of water and objects.
- The horizontal back and forth with the bike
- Containing sand, whilst continuing to experience the back and forth movement of the bike

Atherton (2013), Athey (2007) and Nutbrown (2011) identify that such motor actions and perceptual feedback form the foundations for cognitive development and future learning. They recognise the importance of both recognising and understanding " the subtle… complex details" such observations convey (Atherton, 2013:26).

Hannah's use of the bike and car to push herself along suggest a form of thought relating to a horizontal dynamic back and forth schema. Athey (2007:122) identified that "when the youngest project children toddled they simply *displaced* themselves. Later they picked up objects and *displaced* those." On this occasion, Hannah seemed not to displace objects, but used the bike and car to *displace* herself. It is not possible to establish from this observation if she is also exploring "*starting-points"* and "*points of arrival,"* as she *displaces* herself within the outdoor area (Athey, 2007:123). Robson (2012) uses the term "spatial orientation," suggesting that this is about coming to know environments through a cognitive mapping of a process. "Developing spatial orientation competencies is a long process" (2012:172). Walking, scooting and biking around the outdoor environment provides Hannah with the opportunity to take greater perceptual notice. It provides opportunities to gain an understanding of the concepts of length, speed and time as she travels within the spatial environment.

The tipping and pouring of water suggest a form of thought relating to a dynamic vertical schema. Hannah's exploration of the water is not aimless. Forman (1994) identifies how the properties of different media can "influence thought" and encourage a "biased perspective." Hannah demonstrates purpose by using the dynamic properties of the water to nourish her schema. Initially starting with a red and yellow watering can, she seems to explore and observes the water spray as it flows through the nozzle. She then repeats this with a blue and yellow

watering can. Hannah demonstrates her understanding that to make the water flow through the nozzle is dependent on the angle the watering can is held and tipped. Athey (2007) would categorise such actions at a functional dependency level.

Athey (2007) believes that containing and enveloping schemas assist in developing knowledge of insideness, going through and size. This is further supported by Atherton's (2013:116) recent research, in which she proposes, "as children put things inside containers the idea of going through…is being developed." Nutbrown (2011:30) points out that the "combination and connections of schemas develop into higher-order concepts." The co-ordination and connection of Hannah's dynamic vertical trajectory schema and containing and enveloping schema could result in Hannah developing an understanding that by changing how (the angle) the watering can is tipped, the configuration of the water would be changed as it flows out of the watering can. Forman (1994:38) states, " a transformation in the medium that a child can easily produce is an affordance. Each affordance provides the child with a method to explore an idea by transforming the medium." This suggests that Hannah has understood the affordance of the water and is able to transform its configuration (visual perception).

The seemingly unconnected action of putting an object into a bowl and covering it with water could be viewed by Forman (1994) as a further exploration of the properties of water, its ability to be displaced (transported), contained and used to envelope other objects. Without the evidence of language to support the observation, Athey (2007) would have argued that this should be categorised at a motor level.

Atherton (2013), Nutbrown (2011), Meade and Cubey (2008) and Athey (2007) all agree that children's schematic explorations can lead to mathematical learning. Atherton (2013) introduces a table formation to help identify and illustrate children's possible thinking. Adopting this format Table 5.1 identifies Hannah's possible mathematical learning as she explores her containing and enveloping forms of thought with the water.

Concept	Actions	Possible learning
Size	Placing objects in bowl. Figure	The object fits inside the bowl. The object is small in comparison to the bowl
Volume/capacity	Ladling water into bowl Figure	Full ladle of water only covers a small area of silver bowl
Quantity	Continuing to ladle water into bowl	How many more ladles of water to cover the object

Table 5.1

Possible mathematical learning

Conversations with Hannah's key worker provided further evidence of her containing and enveloping forms of thought.

"Yes she wraps babies up in the bed and the cot, like they are going to bed".

"She loves shaving foam. She would rub it right up her arms. When we did body painting she would cover her whole body all her legs as much as she could cover".

"When painting, she will cover the whole page"

"She enjoyed making dens, she just loved being in them".

Hannah continues to match content to her forms of thought as she moves to explore the rice and containers in the indoor environment. The significance within this observation is her use of numbers. Penderi and Petrogiannis (2011) suggest that culture has a mediating effect on children's development through the orchestrated roles parents play in children's experiences. Super and Harkness (2002) identify that micro environments (home) are closely constructed to reflect parental ethnotheories; meaning parents cultural behaviours and beliefs are mediated through their parental practices.

> She [Hannah] always sits with me and Ryan [older brother], she has her own book, we count and colour, it encourages Ryan to do his work…

> When we are at the supermarket we count everything, the tins, the crisps, then again when we put it away. (Visit transcript 21st June)

Hannah's number knowledge could be a result of cultural transmission. Through experiences with adults and older siblings who use numbers, Hannah has been introduced to naming and counting. This supports Munn's (1997) belief that knowledge and use of number names follows a Vygotskian development pattern:

> First, counting appears on the social plane, between people, with children's activity supported by language and goals. After considerable experience of this children internalize the cultural practice of counting. It then appears on the psychological plane, at which point children are able to direct their counting according to adult principles.
> (Munn, 1997:18)

In contrast, Athey (2007) identifies that the speech children use reflects their forms of thought (schema) or the content. Implying the process of cultural transmission is not singularly or totally responsible. Hannah's horizontal trajectory interest (*form of thought*) provides a meaningful context for the acquisition of abstract number concepts.

> She [Hannah] knows all the number songs, we are always singing them together, we borrow the preschool song box with songs to number ten. … We sing more songs now, Hannah loves numbers. She is always counting things. (Keyworker Interview transcript)

Athey (2007) would perhaps compare the process of cultural transmission to that of "flesh[ing] out" Hannah's cognitive advances (Athey 2007:167).

Heuristic play: 'stacking' (30th May 30 months)

Hannah was sitting alone with the heuristic play resources. Hannah stood up to collect some resources and smiled at me; I took this as my cue to become involved. I sat facing Hannah on the mat.

Hannah appeared to take her time to precisely select a range of particular resources, before finding a place on the mat to sit.

Figure 5.31

Collecting

Hannah proceeded to place the small objects inside the larger objects, before taking them out and repeating the whole process again and again.

Figure 5.32

Into

Figure 5.33

Out

Figure 5.34

Inside

Figure 5.35

Gone!

Hannah spent an extended amount of time repeatingly putting objects inside, before taking them out again. Today was the first time I observed such calm and stillness within Hannah's actions. The investigative process appeared calm, methodical and organised. Hannah appeared to study how the objects looked, possibly exploring this concept with different objects. At times the objects remained visible, whilst at other times the objects seemed to disappear. As Hannah continued to explore, she observed that not all the objects fitted inside each other.

Figure 5.36

Within

Figure 5.37

On top

Figure 5.38

Fitting together

Hannah spent time exploring the different metal, plastic, natural, and cardboard objects. Putting them inside, taking them out, then re-testing. Whilst I cannot presume to know Hannah's thoughts today I believe she noticed, identified, and made new discoveries through her practical engagement with a self-selected range of objects. I observed Hannah for over twenty minutes. The room was busy and noisy, but Hannah did not seem to see or hear this today.

Discussion

From a vast array of objects Hannah selected seven objects, before finding a space to sit to conduct her exploration and investigation. Neisser (1976:80) describes this as a perceivers filtering system: "perceivers pick up only what they have schema (ta) for, and willy–nilly ignore the rest." Carr (2001:9) describes knowledge and skills used with a particular purpose in mind as "situated learning strategies." Hannah's containing and enveloping schema not only sensitises her to match *content* with her *form of thoughts,* it provides the purpose and motivation to learn (Atherton 2013).

An increasing body of research (Carr and Lee 2012; Moss, 2010; Claxton 2008; Carr, 2001 and Dweke, 1999) supports the suggestion that cognitive intelligence is not about mastering new techniques and skills, it is more to do with attitudes, beliefs, emotional tolerance and values. Claxton (2008:1) defines these as 'dispositions'. Carr (2001:21) suggests that a useful way of understanding dispositions is seeing children as being "ready, willing and able… a combination of inclination, sensitivity to occasion and the relevant skill and knowledge." Claxton and Carr (2004) consider dispositions to be dynamic, meaning that they are not acquired in a one-off process, but will display themselves in different ways at different times. On this occasion, Hannah's persistence with her containing and exploration is easily spotted, as she remains focussed for a twenty-minute period. From a dispositional perspective such persistence can also be identified on other days as Hannah continually returns to repeat and re-try activities. Katz (1988:30) suggests that dispositions can "be thought of as habits of mind, tendencies to respond to situations in certain ways," a definition that resonates with the form of intrinsic motivation that schema appears to afford young children.

Within the EYFS (DfE, 2012), engagement is identified as an important role in young children's learning (Early-Education, 2012). Laevers (1976) work initially identified the importance of links between children's involvement and learning. Laevers (2000) suggests that high levels of involvement are supported, when children are given choices: "the more children can choose their own activities, the higher will be their level of involvement" (Laevers, 2000:26).
Hannah's interest, motivation, persistence and involvement continues to be illustrated through her schematic interest. Irrespective of her limited age (30 months), she is already an actor in her own learning.
Without speech or knowledge of Hannah's thoughts, Athey's (2007) schematic interpretation of this activity would classify it at motor level.

At home: 'shapes and spaces' (21st June 31months)

Hannah was at home today. She was sitting on the living room floor completing a jigsaw. Hannah's Mum explained how Hannah enjoyed doing jigsaws and could even do her elder brothers' 'Cars' jigsaw on her own, without needing the picture. When Hannah finished with the jigsaw she put all the pieces back inside the box.

Figure 5.39
Completing

Figure 5.40
Putting away

Hannah seemed pleased to see me. She looked around the room to find and show me many of her toys. I felt that she was happy for me to be in her house, she was giving me her consent.
Hannah asked about her truck. It took her a little time to locate it. She looked in many places. Through her persistence she found the truck and the truck driver.

Figure 5.41

Finding

Figure 5.42

Showing

Figure 5.43

Inside cab

Hannah attempted to put the driver inside the cab on the truck, which was not easy. It took several attempts before Hannah was satisfied and the truck was ready. Hannah's insistence to have the driver inside the truck provided continuing evidence of her containing forms of thought

Figure 5.44

Pushing

Figure 5.45

Pulling

Hannah used the TV table to make the truck move back and forth, pushing the truck forwards and pulling it back. Hannah appeared to know just how hard to push the truck to make it roll all the way to the edge, before pulling it back and repeating the activity.

The back and forth horizontal movement of the truck brought to mind a similarity with Hannah's bodily exploits on the 24th April, in the outdoor area. On that occasion it was Hannah herself who experienced the horizontal back and forth movement as she marched and scooted back and forth around the outdoor area at the nursery. Hannah's endeavours on 15th May meant that she had spent time traveling back and forth on the bike, as she repeatedly rode over the bridge. I feel I am beginning to come to know Hannah and that I am gaining some understanding of her forms of thought

During my visit to Hannah's home her Mum made drinks. The empty cups attracted Hannah's interested. Displaying great care she began to explore how to fit the cups together. Hannah's princess cup fitted easily inside the big green cup. As Hannah explored, her mother supported and narrated the investigation.

Figure 5.46
Inside

Figure 5.47
Too big

Mother: Hannah take care, these are real cups
Hannah: My cup, my cup in. My cup in Mum's
Mother: Yes it fits inside my cup… My cup is too big, it will not fit in

Figure 5.48

Inside again!

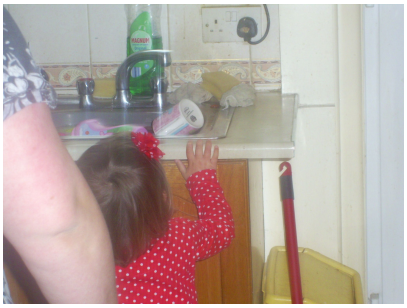

Figure 5.49

In sink

Hannah: Not fit in, not in my cup. I put away now

Mother: Oh, oh ok put them into the kitchen

Hannah: In sink, I put in sink.

Fitting and containing the cups provided almost an identical experience to Hannah's explorations with the heuristic play on the 30th May.

Hannah also appeared to have an interest in tidying up- putting objects away – the jigsaws in the box, and the cups in the sink. Whilst the content varies, all of these activities relate to a form of thought consistent with a containing schema. Causing me to wonder is it the size of objects, or the insideness or the static patterns that objects make, which drives her interest - her form of thought?

Discussion

Hannah continues to explore her forms of thinking related to containing and enveloping, freely selecting and matching content from the toys available to her. Piecing together a jigsaw puzzle enables her to create shapes and spaces that can be used to contain other pieces.

Figure 5.50

Shapes

Hannah understands that completing the picture (jigsaw) is dependent on her fitting together all of the pieces. Hannah's mother explains that "she loves jigsaw puzzles, she can do most of Ryan's (brother) some she can do without the picture. She puts together the edges then fills in the space in the middle" (visit transcript 21st June). This is a task that requires high level concepts recognising and understanding of shape and space (Athey, 2007).

Completing the jigsaw puzzle involves Hannah in trying to fit and contain two-dimensional shaped pieces. Furthering her understanding of mathematical concepts of width, length, trajectory and orientation. Hannah is using her developing mathematical knowledge to complete the jigsaw puzzles. She does not yet accompany such actions with language, and whilst I cannot tell exactly what her thoughts are I suggest they could be something like –' if I turn this around, the straight edge will fit there' indicating "a busyness of thought upon which increasing complex concepts could be built" (Atherton, 2013:43).

Hannah's choice of surfaces to push and pull the toy truck along suggests a functional dependency level of thought (Athey, 2007). Recognising particular surfaces can hinder or support the movement of the truck. Although her thoughts were not supported by language, her involvement, and meticulous care in the activity suggest her thoughts could have been – 'must take care, only need a gentle push, a big push will send it too far, it will fall off the end and crash onto the floor.' Implying the recognition of a relationship between the amount of force and the distance the truck will travel.

Hannah continues to test out her mathematical skills (size and shape) as she initially places the small cup *inside* the large cup, and then balances the large cup on top of the small cup, before replacing the small cup *inside* the large cup and placing them both *into* the sink. She is using speech to support her actions: "my cup, my cup in. My cup in Mum's… not fit in, not in my cup." This is further reinforced by her mother's appropriate and elaborating commentary (big, inside, not fit). Matching language with Hannah's actions provides Hannah a "synchrony with acquired meaning" (Athey, 2007:167), a match between language and her forms of thought. Hannah has already demonstrated her sensitivity to elements in the environment that nourish her form of thought. Such sensitivity will also include language (Atherton, 2013; Nutbrown 2011 and Athey, 2007). Athey (2007:167) highlights "that speech used by project children reflected prominent schemas as well as the content assimilated to schemas."

Nutbrown (2011:29) also suggests schemas can provide parents and professionals with a way to become "in tune with children's cognitive concerns." A view reflected by her mother's comments:

> I wouldn't have let her do that (stack the cups) before this (involvement in research project). Now I understand better, I realise why she wants to put her truck on the TV cupboard. I find it really interesting, I have really started to watch her, I try to use my speech to support her ideas more. (Mother. 21st June home visit transcripts)

Such 'tuning in' will ensure that Hannah's present encounters feed her future endeavours.

Dolls: 'baby play' (27th June; 30 months)

Hannah seemed pleased to see me today, stopping and giving me a huge smile.

Figure 5.51

Baby

Hannah was pushing the pram with a baby (doll) inside. Hannah methodically pushed the pram around the outdoor area. Perhaps taking the baby for a walk? Today Hannah seemed to be very engrossed with the idea of babies. Within nursery Hannah sees the babies each day when they come into the outdoor area.

Figure 5.52

Steering

Figure 5.53

Pushing pram

Hannah pushed the pram backwards and forwards around the outdoor area, with the baby inside. She steered carefully over the bridge and around the objects, taking care not to bump into the younger children.

Figure 5.54

Stuck

When Hannah encountered a problem she shouted.

Hannah: I stuck, I stuck

Practitioner: Pull the pram back. I will move the watering can.

Hannah: Pram back, I pull pram.

Practitioner: What are you doing Hannah?

Hannah: Push pram, push baby.

Hannah proceeded to take the baby out of the pram and placed it into a crib.

Figure 5.55

Rocking

Figure 5.56

Shshsh

She expertly placed the baby at the top of the crib and began to gently rock the crib backwards and forwards. When George came across, Hannah looked at him and spoke.

Hannah: shshsh (as she rocked the crib)

Hannah continued to rock the crib for a few more moments. She then walked around the outdoor area until she found another baby.

At times Hannah seemed to treat the doll like a real baby, conversely at other times it became just an object for her to explore and investigate with.

Figure 5.57
Another baby?

Figure 5.58
Bath time

Hannah placed the second baby in the tub. Selecting a small plastic jug she began to tip water over it.

Figure 5.59
Shower time

Figure 5.60
Covered in water

Later in the morning Hannah is observed helping with the nursery babies. Kerry (key worker) explains that Hannah regularly spends time helping and playing with the babies when they visit the nursery room. Figure 5.61 and 5.62 illustrate how Hannah finished her morning playing and taking care of the real babies in the nursery.

Figure 5.61

Peekaboo

Figure 5.62

Real babies

Discussion

Hannah confidently recognises and selects content that continues to nourish her forms of thought. Nutbrown (2011:40) explains that it is only through a consistency of curriculum and pedagogy that young children can become "active and independent learners." Athey (2007:115) believes the actions of pushing prams, rocking cribs back and forth, pouring water and placing dolls inside prams, cribs and containers provides evidence of "action schemas," distinguishing them as a dynamic back and forth, and as a containing and enveloping schema.

Whilst pushing the pram, Hannah is heard to shout, "I stuck, I stuck." Atherton (2013:50) describes a similar episode in Henry's play: "Henry held up his train and tractor before naming them and asserted 'I go orry, I go ca'." Atherton believes that in holding up the toy and using 'I', Henry was attempting to communicate with the adult, using his language as a social tool. This suggests that when Hannah shouted, "I stuck, I stuck," she was also trying to gain the attention of the adult, using language to convey a message. At 31 months, Hannah's knowledge of spoken language is limited, whilst she is able to convey a simple message using utterances of a few words, her accompanying thoughts may have been more complex: ' I need help to pull the watering can away from the wheels of the pram.' Hannah understood that in order to attract help, she needed to ask for it. This suggests an understanding of cause and effect between the use of language and gaining adult attention and help. This provides evidence of Hannah's increasing cognitive competencies.

Placing the doll in the crib, and rocking it backwards and forwards, could in its simplest terms be construed as a motor level activity. However, Hannah's use of speech "shshsh" as she rocks the crib back and forth, portrays her intent for George (child) to be quiet, therefore inferring that the baby (doll) needs quiet, if it is going to sleep. This suggests Athey's (2007) definition of functional dependency, that sleep is dependent on a quiet environment. Under further consideration, Hannah's use of unsupported speech could also indicate that she is able to view the situation from the babies' perspective, suggesting, as Piaget and Inhelder (1969) identify, that Hannah has the ability to understand events that are happening outside of her self. If this is the case it suggests that Hannah is able to orientate her thoughts in order to recognise that the baby needs a quiet environment to fall asleep in. Potentially categorising this as a symbolic representational level activity (Athey 2007), evidencing Hannah's continuing developing cognitive advances.

Hannah's following actions of placing a doll in a bowl of water and tipping water over it could be easily construed as undesirable behaviour. Athey (2007:140) points out "two satisfactory aspects of schematic interpretations is that they embrace a wide range of behaviours, and interpretations are positive." A positive interpretation would suggest that Hannah appears to have reverted to a motor level activity of containing and enveloping, placing the doll in a large container and enveloping it in water using her dynamic vertical trajectory schema. It is not possible to know Hannah's thoughts. She may have initially considered bathing the baby. It is important to understand that Hannah is not displaying any malice towards the doll. She is not trying to drown it, she is continuing to explore her form of thought.

Atherton (2013:26) reminds us that looking closely at what children are doing can provide "insightful views of the subtle, complex details of children's schematic behaviour." This could suggest that Hannah is interested in both the configurative and the dynamic pattern of the water as it flows over the solid body of the doll.

When interacting with the babies in the nursery, Rogoff (1990) would suggest that Hannah is actively putting herself in the role of apprentice, placing herself in

a position where she can learn from a more knowledgeable other (staff member). Whilst Hannah interacts with the babies, a knowledgeable staff member will be close by using meaningful speech to further links with Hannah's actions and by offering guidance with the babies' safekeeping.

Moving objects: 'distances' (14th July; 31months)

Hannah was alone in the soft play area. She responded quickly to my hello, but did not stop.

Figure 5.63
Organizing

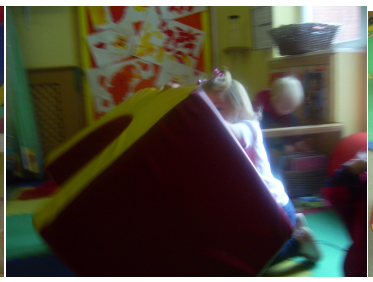

Figure 5.64
Moving

Figure 5.65
Testing

She seemed to be moving the large soft play shapes around, pushing and pulling them backwards and forwards. At times it required her whole bodily force to manhandle the larger shapes.

For a moment Hannah stood and paused, appearing to muse over her efforts. The shapes seemed to be organised in a long horizontal row along the mirror wall.

Figure5.66
A row

Hannah moved into the outdoor area. Sitting inside a car, Hannah used her feet to move the car. Hannah was able to control and direct the car forwards and backwards.

Figure 5.67
Stationary

Figure 5.68
Moving

Leaving the car, Hannah began to run and chase around, hiding behind plants, and moving up and down over the bridge. Hannah seemed very energetic this morning.

Figure 5.69
Behind

Figure 5.70
Over

Hannah spent time marching back and forth across the bridge. I have seen her do this before.

Returning indoors, her focus moved towards the toy cars. Hannah held up the wooden car, looked at me and made a car noise.
Hannah: Brumbrum… car go fast.
Hannah pushed the car across table
Hannah: Car go…crash… I make car go far…I make big crash.

Figure 5.71

Crash

Figure 5.72

Big crash

Hannah re-built the pile of bricks and repeatedly pushed the car into the brick. Each time the car hit the bricks Hannah said "crash." Hannah used more bricks to build a higher pile. Hannah told me: "I make a big crash." It appeared Hannah understood how to make the car crash, and how to make a big crash.

At last I feel I am coming to recognise and understand, I have been privileged to witness how Hannah's exploits at home and in the nursery have united to form greater cognitive competency. Whilst the content and match within the environment continue to nourish Hannah's schema, recognition of her form of thought requires both deep understanding and freedom of time to follow and closely observe her continual interactions and investigations across the nursery environment.

Discussion

Hannah continues to illustrate the actions of the "honey bee" (Mead and Cubey, 2008:38), spending the morning collecting experiences to feed and nourish her forms of thought. Her actions display continuity as she selects content to feed her interest in a dynamic horizontal trajectory schema (Atherton, 2013; Nutbrown, 2011 and Athey 2007). To the untrained eye her playful and physical episode with the soft play could be seen as aimless and pointless. Conversely pushing, pulling, sliding and rolling the large soft play shapes would be seen by Gardner (1984:211) as providing opportunity to "judge the timing, force and extent of our movements and to make necessary adjustments in the wake of this

information." Gardner (1984:207) identifies the importance of developing "mastery" of body motion, describing this as "bodily-kinaesthetic" or "bodily intelligence".

Hannah's persistence and resilience within this activity demonstrates a deep level of involvement, suggesting her possible thoughts may include: 'this shape has a flat side, it needs more force to move, this has a curved side I can move it with a small push, it rolls, this is as big as me, I can lie on it.' Through a process of trial and error Hannah manoeuvres and lines up the shapes one after another. Atherton (2013:49) suggests, "through these trajectory behaviours, an understanding of higher order concepts such as length, distance and addition germinates." Within the outdoors, Hannah continues this exploration, pushing the car, running and marching around, exploring the motion of back and forth, stopping, starting, speed and gradients. Payne and Isaacs (2008) claim such activities allow for continuity in the mastering of Hannah's gross bodily motor intelligence, warning without such opportunities and experiences children will develop gaps in their future learning potential.
In the absence of speech, the actions would be categorised at a motor level (Athey, 2007).

Nutbrown (2011:77) insists that when "pedagogy matches children's persistent forms of thoughts" a breadth of learning can take place. Gardner (1984:207) would explain that Hannah has developed a "mastery" of fine motor control. She understands and possesses the skill to make resources move in a pre-determined way. At 31 months of age, building and stacking the bricks, pushing the car with a measured amount of force to thrust it forwards across the table, but not so it falls off, displays developing mastery in both Hannah's fine motor skills and developing mathematical knowledge.
To make a "big crash", Hannah understands that she needs an increased number of bricks. Hannah stacks more bricks to make a bigger (higher) pile. Whilst it is not possible to assume it appears Hannah's use of speech is not only to accompany her actions, but to instigates a social interaction (Piaget 1959), sharing her intentions: " I make car go fast," and thereby conveying meaning to

her actions: “I make car crash.” Hannah demonstrates an understanding of the relationship between the force (push) and the speed of the car. Athey (2007) would suggest that Hannah’s own internalised experience of movement through a horizontal trajectory allows her to know in advance what will happen to the car when she pushes it. Hannah is able to use her knowledge of actions together with speech to provide a commentary of the action before it has occurred. If this is the case Hannah’s speech followed by her actions could be categorised at a thought level by Athey (2007).

5.3 Final thoughts

In this chapter I have tried to illustrate what can at times be a difficult, messy and ambiguous process of recognising and coming to know an individual child and their schematic interests. Nutbrown (2011:67) describes Jeanette as a child “who apparently flitted from one experience to another: house play, drawing, water, sand, clay, making crackers for imaginary party, giving presents, playing at cooking.” Hannah’s story provides a comparable scenario. Her actions include watering plants, marching around, tipping water on the floor, riding bikes and scooters, stacking containers, lining up balls, crashing cars, pushing prams. From the point of view of the researcher and observer, Hannah’s wide-ranging actions and endeavours regularly provided a huge amount of photographical data and evidence, much of which I initially found confusing and conflicting.
Nutbrown (2011) suggests that far from flitting from activity to activity, children like Jeanette and Hannah are fitting together relevant experiences to match their schematic interest. Hannah and Jeanette select “a set of experiences bound together by an almost invisible thread of thinking” (67). Athey (2007:66) warns against “focusing on content at the expense of form,” however recognising such invisible threads, or forms of thought are not necessarily an easy or straightforward process, but a dynamic and messy process (Hayes 2008:435).

This required observations to be layered and overlapped, allowing the observer to move within and across the evidence collected from week to week, to ponder over the connections in Hannah’s sensitised selection of resources. Only through trusting Hannah’s own judgments and choices of resources was I, over time, able

to begin to recognise the invisible threads that revealed her forms of thought. Once recognised, Hannah's previously "unsystematic" (Athey 2007:66) actions not only made sense, but illustrated Hannah to be considered by Nutbrown (20011:40) as an "active and independent learner," a social actor in her own life.

This is further illustrated by Hannah's love and use of number names. Hannah is able to use number names up to ten. This is not a skill initially initiated in the nursery or directly taught at home. Athey (2007) and Super and Harkness (2002) would suggest it is through a combination of cultural transmission processes and Hannah's horizontal trajectory interest of her form of thought that provides a meaningful context for the acquisition of abstract number concepts. This in turn causes Hannah's key worker to provide further content to nourish, consolidate and extend her number knowledge, once again suggesting Hannah is a social actor in her own learning.

This chapter has shown that when adults have a deep knowledge of pedagogy and child development, combined with trust and respect young children can really thrive and become leaders of their own learning.

The next chapter will introduce Emily the narrative observations will tell of her and interest in dynamic back and forth, containing, enveloping and transporting schemas

Chapter 6 Emily

6.1 Emily's dynamic back and forth, containing, enveloping and transporting schemas.

Emily was born on 29th May 2010 making her 23 months old at the start of the data collection process. Emily attends nursery for three half-day sessions each week. Emily is an only child. She lives at home with her mother and father.

Emily arrives happily at the nursery at the start of each session, calmly and quietly saying goodbye to her mother. Emily displays a spirited and cheerful disposition, with a vivacious sense of fun, and an animated smile. At times, Emily appears reserved, choosing to watch the day-to-day goings-on, before trying and experiencing activities herself. However, once involved, Emily displays a high level of energy and purpose within her daily exploits.

6.2 Narrative observations

Apprentice: continuities of thought (24th April 23 months)

Figure 6.1
Smiling

Figure 6.2
Back and forth

Emily was in the outdoor area when I caught up with her today. I reminded her of my name and asked if I could watch her play. She seemed happy with this. She smiled at me, then continued to walk back and forth across the bridge as shown in

Figure 6.1 and 6.2. Emily seemed to pay little attention to the adult (staff member) who was singing a marching song. "Marching along singing this song as we go. We can march up, up, up, down, down, down. Marching along singing this song as we go."

Emily spotted her key worker (Leanne), and joined her at the water butt. Leanne was filling and tipping water from the watering can. Emily appeared to join in the play. She selected a container and proceeded to fill it with water and then tipped it out. Emily's face revealed her interest as she watched the water fall in a long straight line from the container. Leanne narrated Emily's actions, as she repeated and further explored the movement of the water.

Figure 6.3
Shared play

Figure 6.4
Tipping

Leanne: Emily is tipping the water… Can you see the water… the water falls down…Can you do it again…Emily make the water fall again.

Emily quickly became absorbed with the activity. When Leanne moved away, Emily picked up and used Leanne's watering can. Emily next selected a small blue jug, using it to continue her exploration of tipping and pouring the water.

Figure 6.5

Exploring

Emily's involvement with this activity continued. She repeatedly tipped and poured the water as shown in figure 6.5.

It was a while before Emily spotted Leanne near the drum. Together they played on the big drum.

Emily used the shakers as drum sticks, moving them up and down to hit the drum.

Figure 6.6

The drum

Figure 6.7

Taking turns

Emily followed Leanne indoors. Leanne helped the younger children on the slide. Emily joined in. She patiently waited to take her turn to climb up the steps and then walked down the slope of the slide. I believe Leanne was talking with all of the children, but I was unable to hear.

Leanne moved away, and Emily remained at the slide, repeatedly climbing up the steps and walking down the slope.

Figure 6.8

Up, down

I was able to move closer. Emily noticed me and smiled.

Researcher: Emily is on the slide… Emily can go up and down… Emily at the top… Emily at the bottom.

Emily made no verbal response; she did however keep smiling at me. I took this as a cue to continue my flow of speech.

After many trips up and down the slide on her feet, Emily announced, "I sit." She then proceeded to slide down the slide on her bottom, repeating this action many times.

Figure 6.9

Sitting

Discussion

Within early years, the debate around the importance of young children feeling safe and emotionally secure is becoming more and more accepted and understood (Page et al 2013; Clare, 2012 and Gerhardt, 2004). The Field (2010) report highlights that "children's life chances are most heavily predicated on their development in the first five years of life" (5). Field (2010) identifies social and emotional development in young children as a contributing factor to a successful adulthood. A view further supported by Allen (2011) who reports:

> A key finding is that babies are born with 25 per cent of their brains developed, and there is then a rapid period of development so that by the age of 3 their brains are 80 per cent developed.
>
> In that period, neglect, the wrong type of parenting and other adverse experiences can have a profound effect on how children are emotionally 'wired'. This will deeply influence their future responses to events and their ability to empathise with other people.
>
> This is not to say that development stops at age 3 – far from it; but the research indicates that we need to intervene early to make sure that our children get the best possible start in life. We need to keep supporting them throughout childhood in ways, which help them reach the key milestones of social and emotional development. (xiii)

Clare (2012) describes how, within care settings, key person or key worker systems are used to support young children in developing close relationships. Such relationships allow children to form multiple attachments. Nutbrown and Page (2008:24) affirm: "indeed some may argue that a lack of multiple attachments in the early part of life could also be detrimental to babies' social development." It would appear that Emily has developed such an attachment and relationship towards her key worker, Leanne. Emily appears to ignore the support from the less well-known adult as she moves back and forth across the bridge, choosing instead to actively seek out her key person. Elfer et al (2012) describes the key person role as one that:

> Makes sure that, within the day-to-day demands of the setting, each child feels special and individual, cherished and thought about by someone in particular while they are away from home. It is as though the child was camped out in the key person's mind or that there is an elastic thread of attachment that allows for being apart as well as for being together. The child will experience a close relationship that is affectionate and reliable. (23).

Robert (2010) identifies the role of a companionable apprentice. It seems that within this scenario, Leanne has become Emily's key person (Elfer et al, 2012) allowing and supporting Emily to become her apprentice. Emily observes, as Leanne models and demonstrates, before Emily then begins to explore for herself. Atherton (2013:158) reports that as a key worker, the adult's role involves the identification of the child's intrinsic motivations, implying Leanne "should not only respond to, but also anticipate" Emily's interests and motivations. This suggests that Leanne's presence and actions within this observation are not merely coincidental, but rather that Leanne has come to know Emily as a result of careful observation. With such obvious emotional security in place, it would seem that Emily is ready to join in the culture of learning.

Whilst Emily chooses to join Leanne in particular activities, a constant thread can be recognised to be running through her choices, described by Athey (2007:113) as "commonalities and continuities ('cognitive constants')." The up and down movement across the bridge, the tipping of the water, the vertical movement of the shakers, and the up and down movements on the slide all suggest "dynamic vertical schemas" (115). Nutbrown (2011:46) would consider that at only 23 months of age, Emily is already demonstrating her ability to create her "own continuities in the process of exploring, thinking and learning."

Throughout the observations, little evidence of Emily's use of speech is gained. Yet in her use of the words "I sit" it felt like Emily was trying to engage my attention. Emily wanted to be heard, she wanted to be listened to. Piaget (1959:20) would charactarise this as socialised speech, suggesting that it is Emily's attempt to share her thoughts, as she confidently furthers her physical and bodily exploration of a dynamic vertical trajectory.

In not knowing Emily's actual thoughts, together with her sparse use of language, it seems that her engagement in these activities is at a motor level (Athey, 2007).

Containing: 'insideness' (10th May 23 months)

Emily was amongst a group of four children, who all seemed to be involved in an activity around the water. I moved closer, as Emily and the other three children had discovered bubbles in the large yellow water tub.

Figure 6.10
Bubbles

Figure 6.11
Covered in bubbles

Emily seemed very excited with the discovery. I asked, "what have you found?" "Bubbles, bubbles, bubbles" she repeated, whilst dipping her hand in and out of the bubbles.

As Emily enthusiastically thrust her hands into the bubbles, she discovered a toy animal. Lifting it out of the bubbles, Emily spent several moments examining it, turning it around. She did not speak, but seemed to momentarily pause as she examined the toy animal covered in bubbles. Moving backwards towards the toy car, Emily placed the bubble-covered animal into the small compartment at the back of the car. It emerged that there was already a toy animal in this compartment. I am unsure if this is Emily's previous work.

Figure 6.12
Toys in

Figure 6.13
Emily in

Emily climbed into the car. She held the steering wheel, closed the door and sat inside the car, seemingly making little attempt to move the car.

Figure 6.14
Emily's car

Figure 6.15
Confrontation

Emily remained in the car. She seemed to be sitting and watching the other children as they moved around the outdoor area. When approached by a younger child, Emily held onto the door to prevent it from being opened. As seen in figure 6.15 Emily appeared quite determined to hold her ground not moving from within the car. The confrontation lasted for a few moments. Neither Emily nor the younger child seemed particularly bothered by the outcome. I feel that this is a situation they have experienced before.

Emily remained inside the car, gradually and slowly beginning to use her feet to push the car around the outdoor area.

Figure 6.16
Pushing car

Eventually Emily climbed out of the car. She removed the toys from the rear compartment, throwing them to the ground, before placing her hands inside the compartment. As seen in figure 6.16 Emily placed her whole weight onto the car to

push it forwards, whilst keeping her hand inside the compartment. Emily continued to push the car until another child climbed into it. Emily turned and told me "I finish, I done."

Emily returned indoors, gesturing to an adult to help her with her coat. Emily's attention focused on her shoes. Emily's key worker told me that she loves shoes, referring to when she first joined The Tweeny Room. Emily initially spent her first few morning sessions simply putting on her shoes and Wellington boots and taking them off again. Emily's mother also confirmed an interest in shoes describing when a visited to the shoe shop. "She got these shoes in Clarks, then she was showing everyone around town… In her pram going shoes, shoes to complete strangers… She can get frustrated with the buckle…she is trying to figure it out" (Home visit transcript 21st May).

Figure 6.17
Emily's shoes

Emily spent several minutes attempting to fasten her shoes before gesturing that she needed my help. Once successfully fastened Emily's attention quickly turned to the indoor water tray

Figure 6.18
Water tray

Figure 6.19
Water wheel

Emily began to tip and pour the water she quickly became involved, not noticing the other children that came to play alongside her. Finding the water wheel, clearing a space, standing the water wheel upright Emily began to pour the water into the top. Emily closely observed as the water ran down and made the wheels turn (figure 6.20). She repeated this many times. Emily seemed very amused by this, as she repeatedly laughed each time the wheels turned.

Figure 6.20

Turning wheel

Figure 6.21

Fun

Figure 6.22

Purposeful exploits

Emily continued with her purposeful exploits, tipping and pouring water from a variety of different sized jugs and containers, for the remainder of the morning.

Discussion

When describing Henry's containing and enveloping behaviour, Atherton (2013:36) explains "he regularly placed assorted objects (sand, soil, stones, dry pasta, crayons, toy animals, Lego chalks) into a variety of containers and enclosed himself within or underneath a range of items." Emily's actions suggest

similarity in her forms of thought, as she also places objects inside others. Emily's interest in shoes, taking them on and off, could also be considered as part of this form of thought. This infers that Emily uses both her body and a selection of resources to pursue her containing and enveloping forms of thought. Simply identifying Emily's schemas in not sufficient. Nutbrown (2011:18) maintains that if we are to "extend learning," we must first gain a greater understanding of their thinking.

When considering Emily's detailed actions, it is difficult to differentiate between containing and enveloping due to both actions being observed simultaneously. Similarly Athey (2007) found it difficult to "quantify co-ordinations of schemas," suggesting enveloping and containing schemas can prove "difficult to differentiate between"(146). Emily contains and envelops her hands in bubbles, before containing and enveloping toy animals in a water-filled hollow section at the back of the car. Emily climbs inside the car. In closing the door, she seems to contain herself inside the car - or is Emily climbing into the enveloping space of the car? Finally, in placing her hands in the water inside the hollow at the back of the car, Emily could be considered to be both enveloping and containing her hands.

Piaget and Inhelder (1969:5) explain experiences are modified by the child and "become incorporated into the structure" This resonates with Athey's (2007) understanding that, as Emily gains experience with such a variety of content, she is able to assimilate and construct further information and meaning within her forms of thought, possibly extending and even constructing new *forms.*

Atherton (2013:158) indicates that it is only through careful observation that we "can come to know and more fully understand, what young children are actually thinking about when they play." Emily's persistence with her forms of thought through a range of different content could signify an inherent interest in insideness.

Without knowledge of Emily's thoughts and in the absence of speech, Emily's containing and enveloping exploits would be considered as motor level actions.

Whilst Athey (2007:140) explains that such actions are an extension of Emily's "earlier locomotion skills," these actions must also be considered as providing Emily with valuable experiences of spatial relationships. Indeed, Athey (2007) and Nutbrown (2011) tell how ideas of inside, outside and containing can develop into later mathematical knowledge of measure and space.

In her earlier book, Athey (1990) states " *functional dependency relationships* are manifest when children observe the effect of action on objects or materials" (70). Emily's exploits with the water wheel illustrate her understanding that, in order to turn the wheel, she needs to tip the water, suggesting that she understands that the turning of the wheel is functionally dependent on the water. Athey (1990:70) explains that the understanding of functional dependencies "arises from the application of earlier schematic behaviours." This suggests that Emily's previous dynamic trajectory explorations on the slide and the tipping of water have supported and influenced her developing "intelligence." Whilst Piaget and Inhelder (1969) write:

> There is a continuous progression from spontaneous movements and reflexes to acquired habits and from the latter to intelligence. The real problem is not to locate the appearance of intelligence but rather to understand the mechanism of this process (5).

Perhaps viewing Emily's actions through a schematic lens provides the opportunity to better understand the "mechanism of this process" (5).

Whilst we are unable to know Emily's thoughts, Emily's reaction and her repeated laughter could suggest enjoyment. Emily is expecting the wheel to turn before it actually does, implying Emily is able to carry out this operation in her mind before completing the motor action. If this is the case, Emily's experiences illuminate and illustrate Piaget's notion that "thought consists of internalised and co-ordinated action schemas" (1959:357). Emily's involvement and ease with this activity is more than a functional dependency understanding between the water and the wheel movement. Emily's laughter suggests that she is able to anticipate what is going to happen, supporting Athey's (1990:70) belief that functional dependency can be considered "as a sub-division of thought level."

Intrinsic motivation: 'play and struggle' (19th May 23 months)

I was able to observe Emily for several minutes before she noticed me. Emily enthusiastically climbed up the steps and came down the slide.

Figure 6.23
Up

Figure 6.24
Down

Emily continued her exploits on the slide, sometimes running down, sometimes walking down and sometimes sliding on her bottom.

Figure 6.25
Taking care

Figure 6.26
New ways

Other children joined in and Emily took turns, seeming to take care not to knock or bump into her friends.

Figure 6.27

Having fun

Figure 6.28

Walking down

Figure 6.27 illustrates Emily's obvious pleasure and excitement as she descended the slide. At times, practitioners provided support to ensure the younger children's safety, however, I tried to keep my distance so as not to interrupt Emily's focus.

Emily was smiling as she approached me. Taking my hand, she led me to the other side of the room. Finding the wooden animal shape (jig saw) puzzles, Emily took all the pieces out and then began to replace the shapes into the spaces.

Figure 6.29

Jigsaw

Figure 6.30

Puzzle

Each time Emily replaced a shape, she attempted to name the animal. "orse, abbit, duck, pig, sheep, chick." Emily quickly completed two puzzles.

In an instant, Emily's whole demeanour had changed from the loud, lively and whole bodily physicality I observed on the slide, to that of quiet and calm, as she controlled the small precision movements of matching and containing shapes.

Figure 6.31
Concentrating

Figure 6.32
Pondering

Next, Emily collected a selection of small wooden block shapes, removed some shapes from the wooden puzzle, and placed the wooden shaped blocks in the spaces. Emily did not speak whilst completing this task. She took her time, seeming to ponder.

Emily's interest then moved to the wooden block puzzle. Taking her time, she attempted to replace the blue wooden cuboid shape.

Whilst Emily seemed to understand which space it should fit into, she found it difficult to align the corners. Emily could not get the shape into the hole. With encouragement, she wiggled the shape. At first this did not seem to work. Emily pursued this strategy. After a few more moments it slotted in.

Figure 6.33
Uncompleted

Seeming to forget my presence, Emily immediately walked back to the slide, leaving the remaining puzzle uncompleted.

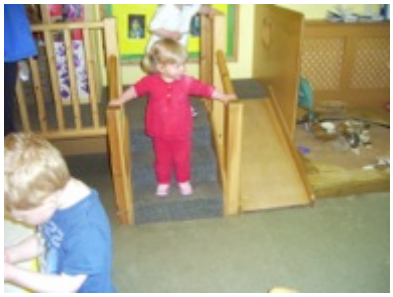

Figure 6.34
Down steps

Figure 6.35
Down slide

Emily stood at the base of the steps for several moments. Although it was not possible to understand her thoughts, I wonder if she was re-playing the shape puzzle, questioning why it had not worked as she had expected it to.

Within a few minutes, Emily had returned to her lively exploits on the slide as depicted in figure 6.34 and 6.35.

Discussion

Emily continues to explore her dynamic vertical trajectory schema through the ascent and descent of the slide (Athey, 2007). In a similar way to Abby, Emily also uses different bodily movements to possibly gain a deeper perceptual understanding of the descent. Athey (1990:70) believes that "operations that can be carried out in the head" are initiated from "sensory and perceptual information accompanying motor actions." This implies that through ascending and descending the slide, Emily continues to develop her internalised understanding of vertical trajectories.

Emily's experience on the slide appears to have been positive, possibly suggesting the smile she had when finishing was one of pleasure about her own cognitive development, rather than her observation of seeing me.

Atherton (2013:50) describes children's selection of content as "discriminating" and "sensitised," meaning that children match and nourish their schema, their forms of thought, through available environmental resources. Emily's selection of jigsaw puzzles reveals her containing and enveloping schema.
Using appropriate speech *"'orse, 'abbit, duck, pig, sheep, chick" to "*accompany [and] to reinforce" (Piaget, 1959:17) her actions, Emily's playfulness could portray her "cognitive confidence" (Athey, 1990:50) with the jigsaw.

Such "cognitive confidence" appears not to be reflected within Emily's attempt at the shape puzzle. Athey (2007:51) proposes children's "functioning ranges from struggle through practice to play." It is plausible that Emily experiences "cognitive discomfort" when she "struggles" to fit the blue cuboid in the puzzle. Although eventually succeeding, Emily's "cognitive discomfort" with this experience could be viewed by her quick exit from the activity.

Observing Emily's behaviour through a schematic lens provides the opportunity to gain a greater understanding of her cognitive development, from playfulness indicating "the well established" to the "struggle" of gaining new knowledge (Athey, 2007:51). At this point it is not possible to gauge, if Emily's struggle was due to her mathematical knowledge of shape and space or her kinaesthetic fine motor control. What is certain is Emily's intrinsic motivation, her forms of thought, will ensure that she continues this development journey. This provides evidence that Emily's schematic behaviour contributes to her becoming a social actor in her own life.

Combining experiences: 'transporting' (21st May 24 months)

Figure 6.36

Toys

Emily was waiting at her front door when I arrived at her house. She seemed very pleased to see me. She happily showed me into her sitting room, where she had a neat row of toys. Emily's mum explained how "Granddad teaches her to put things away when she has finished- she loves doing it…she likes putting things away- I've always been tidy" (Home visit transcript 21st May).

After a short time Emily began to share some of her books with her mother. Rather than walking to select a new book, she crawled on all fours across the carpet, gently nudging the book in front of her.

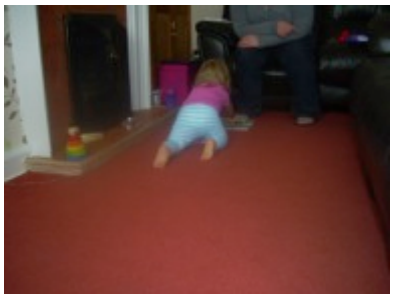

Figure 6.37

Hands and feet

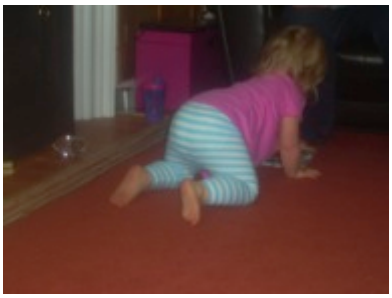

Figure 6.38

Crawling

After a while, Emily chose to stay on the carpet. Lying on her tummy, she independently looked through the book

Figure 6.39

Tummy

Emily's focus turned to her truck. Before sitting on it she took off and replaced the telephone handset as shown in figure 6.40. The circular parts of the handset clicked into the shaped space. I am reminded of the experience Emily had with the wooden block shape puzzle at the nursery. Unlike on that occasion, Emily completed this self-initiated task with ease.

Emily sat on the truck and expertly manoeuvred her way around the furniture, circling the room several times before her attention turned to the small soft football, which she proceeded to kick and dribble around the furniture.

Figure 6.40

Replacing handset

Figure 6.41

Manoeuvring

The game continued until she was distracted by my camera case falling into her path.

Figure 6.42

Dribbling

Emily's mother explained: She likes bags, she fills and empties… the stuff she puts in (laughs).

Emily explored the camera case figure 6.43. She peered inside it. The case had a magnetic catch. Emily folded the lid down. As the catch clicked shut she smiled, then repeated the process. She did this several times before returning it to me.

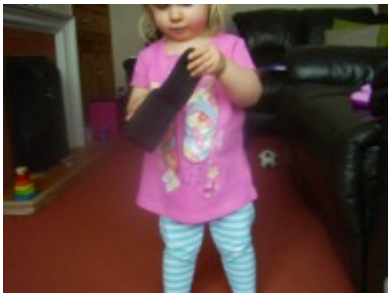

Figure 6.43

Camera case

Once again, Emily quickly moved from a high level of physical activity to a deeply purposeful exploration. I wonder if Emily wishes her shoes would fasten with such ease, why could she fasten the camera case, but still struggle with her shoes.

I believe looking inside the camera case triggered Emily's next flow of thoughts. Picking up a pile of books, she placed them inside her toy pram.

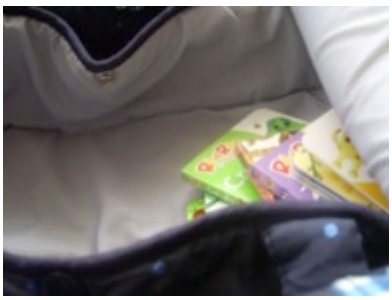

Figure 6.44
Books inside

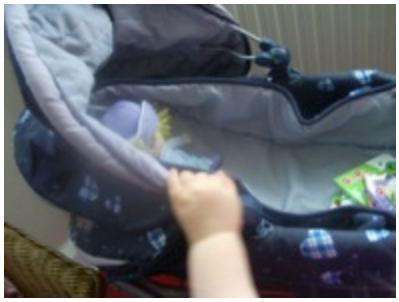

Figure 6.45
Doll inside

Emily found her baby (doll) and placed it inside the pram. She pulled over the fitted pram cover so that the contents were now contained within the pram as seen in figure 6.46.

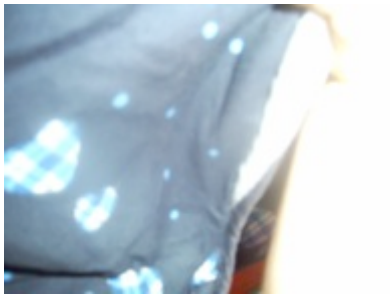

Figure 6.46
Covered over

Figure 6.47
Pushing around

Although rather large in size, Emily managed to push the pram around the settee several times, before it became wedged between the settee and the chair. Emily's facial expressions displayed a deep level of concentration that was required as she attempted to steer the pram. Using her whole body control, Emily successfully steered and directed the pram around the settee, demonstrating her developing knowledge and understanding of shape and space and bodily intelligence.

Discussion

Gardner (1984:18) believed that "the individual is continually constructing hypotheses and thereby attempting to generate knowledge: he is trying to figure out the nature of material objects in the world." When Henry is described

exploring insideness through a range of environmental content, Atherton (2013:38) asserts that the actual "objects were not of consequence, they were just to hand." This also seems to be true with regards to Emily's choice of dolls, drinking cups and books. This resonates with Neisser's (1976:56) description of schema as "a pattern of action as well as a pattern for action." Emily's inherent tendencies influence her forms of thought – her pattern of action - they sensitise her to select objects she can contain and envelope – her pattern for action. Emily's interest and inclination to enjoy tidying up is not a coincidence but would be seen by Nutbrown (2011) as a form of nourishment for her containing and enveloping schema.

Atherton (2013) explains that young children's schema provide the "blueprint through which higher order conceptual understanding" can be gained. It is anticipated that Emily's initial motor action activities will lead to the development of higher order thinking. Meaning through repeatedly and playfully placing objects of different shapes and forms inside other objects (Athey 2007), Emily will continue to gain both sensory and perceptual feedback. Enabling her to successfully accommodate and assimilate information into her forms of thought - her schema.

Emily becomes immersed in her investigation, seeming to contemplate and asking 'what can I do with these objects'? Emily discovers that she can contain many objects *inside* the pram. She can also move the pram around with the objects *inside* it. According to Piaget and Inhelder (1969) at 24 months, Emily's focus within this enquiry is not object permanence. Emily's seemingly new interest could be the result of "newly established connections integrated into an existing schematism" (Piaget and Inhelder, 1969:5), the construction of a new transporting schema. Transporting objects in the pram requires a level of bodily kinaesthetic intelligence. Gardner (1984:207) would consider Emily's "bodily motion and capacity to handle" the pram as the core of her body intelligence. Repeating this behaviour will ensure further mastery of body intelligence, echoing Neisser's (1976:56) description of schema as "a pattern of action as well as a pattern for action."

Water: 'transporting' (23rd June 25months)

It was mid morning. Emily was outside investigating the water. I was able to observe her actions for many minutes before she became aware of my presence. Once I had been noticed, I said hello and asked her what she was doing. "Water, water" Emily responded, as she continued to tip water from the jug to the floor. I asked, "are you making puddles?" Emily did not respond.

Figure 6.48
Water, water

Figure 6.49
Tipping

Emily seemed completely absorbed in her actions, repeatedly filling a jug with water, and then tipping it into a large bowl. I was surprised by her reaction when the bowl was accidentally knocked over by another child. Emily seemed unperturbed. I expected her to display some form of emotion. Instead she selected a yellow watering can and began tipping water onto the floor.

Figure 6.50
On floor

It was not long before Emily's attention and concentration returned to filling up containers.

Figure 6.51

Filling containers

Figure 6.52

More filling

I believed up until this point in time that Emily had used the water as a material to contain and explore dynamic vertical trajectories. As I continued to observe Emily over the next period of time, I began to consider other possible forms of thought, other invisible threads that I had perhaps not previously noticed. Does Emily's interests and motivation also include transportation aspects?

Figure 6.53

Controlling tap

Emily controlled the tap allowing the water to move from the large water butt to her small blue watering can

Figure 6.54

Filling compartment

After filling the small blue jug, Emily used the water to fill the compartment at the back of the car.

Figure 6.55

Over seats

Emily proceeded to scoop water from the compartment at the back of the car and tipped it over the seat.

Figure 6.56

The sand

Emily re-filled the small blue jug, walked to the sand pit and tipped the water from the jug.

Discussion

It appears Emily's interest with water seems to have moved on. This resonates with Forman's (1994) belief that the physical properties of different mediums can influence children's thinking. Initial observations highlight and link Emily's interest in the medium of water with containing, enveloping and exploring dynamic vertical trajectory movements. Athey (2007) would explain that as a material, the fluid properties of water provide a match for Emily's forms of thought, whilst Forman (1994:38) may propose that the physical property of water "easily" provides its "affordance " for containing.

Forman (1994) suggests that different mediums give different messages to children, and explains that the messages are "biased" depending on the medium they originate from. This infers that Emily has received such a message and is displaying "a biased" perspective or view towards the water. Such a view or "bias" towards the medium of water is seen by Forman (1994) as a "strength." Through containing water and investigating insideness, Emily's "bias" has influenced her thoughts, provoking her to consider that once contained, the water can also be transported. Emily now appears to understand that the physical property of water also "affords" transporting.

The absence of speech makes it very difficult to truly recognise the representational significance of Emily's actions, suggesting that this would be catogorised by Athey (2007) at a motor level.

Different media: 'making marks' (5th July 27 months)

Figure 6.57
Scooping sand

Figure 6.58
Concentration

Emily had been sitting very still for several minutes. She seemed to be deeply involved and concentrated, unaware of the other children in the Tweeny Room. I am unsure if she was aware of my presence, she made no response when I said hello. Emily continued to scoop sand and place it inside the bucker for another several moments.
Distracted by another child Emily moved from the sand area to the outdoor area.

Figure 6.59
One to another

Figure 6.60
Accuracy

Emily acknowledged my presence with a smile, before continuing her exploits. She had selected a small clear jug and a small plastic measuring spoon. Standing very still, Emily tipped the water from one to the other. Her actions seemed controlled, appearing not to spill any of the water. Moving to the bridge, Emily placed the measuring spoon on the ground and tipped all the water into it. This time some water spilled. Emily did not seem bothered by this. Picking up the measuring jug she carefully walked to the blackboard and selected a paintbrush.

Figure 6.61

Getting ready

Figure 6.62

Making marks

Dipping the paintbrush into the water, Emily began to use the water to make marks on the board, mainly using a selection of horizontal and vertical movements to create the marks.

Figure 6.63

More water

After refilling her supply of water, Emily returned to the blackboard. This time she selected a wooden log to stand on, as she continued to use the water to create marks on the blackboard.

I wonder why Emily chose to stand on the log (figure 6.64). Was it to intensify her kinaesthetic sense of height, her vertical trajectory, or was it simply to reach higher?

Are these marks a representation of the back and forth journeys she makes as she moves around the nursery?

Figure 6.64

On log

Emily's marks reached to the top of the board. Emily refilled her water supply twice more, each time displaying a strong determination as she marched from the water butt to the blackboard.

Figure 6.65

Refilling

Figure 6.66

Marching

Figure 6.67

More marks

Emily continued until she had covered the whole blackboard.
This is the first time I have observed Emily making marks. Her key worker tells me that she "loves painting, she will often envelope the whole piece of paper with one colour."

Discussion

Emily appears to purposefully and enthusiastically continue to explore and gain experience with containing and transporting, effectively matching her forms of thought with content from within the indoor and outdoor environment (Athey, 2007). Piaget (1959:283) considers such practical exploits as a prerequisite for "symbolism and representation."

Emily's use of vertical and horizontal movements when making marks at the blackboard support Athey's (2007:78) belief that "most early marks are a figurative outcome of bodily movement." This Implies that Emily's mark making on the blackboard could be explained as a representation of her continual horizontal back and forth explorations, together with her interest in dynamic vertical trajectories. Yet Nutbrown (2011) demonstrates how Jeanette represents the actions of containing and enveloping by covering a whole area of paper in one colour. In what can be assumed is a similar representation, Emily uses water to cover and envelope the blackboard. Whilst it is not possible to know exactly what Emily is thinking, it is appropriate to consider Forman's (1994:38) belief that different media allow children to gain a "bias" towards their properties. Signifying the possibility that Emily has discovered yet another new "affordance" for representing her enveloping forms of thought with the medium of water.

Perhaps on this occasion, Emily's intention is not to make representations of her bodily movements, but to use the water to cover the board. Forman (1994:38) believes that "each medium has physical properties that make some concepts more easily represented than others." Emily's "affordance" for representing her enveloping forms of thought, transforms the water into a covering. If this is the case, Forman (1994) would affirm that Emily is using the water to represent a

symbol. Standing on the log enables Emily to reach to the top of the board. If Emily is to 'cover' the whole board she needs to reach to the top. This means that within this observation Emily has moved to a symbolic representational level.

If Emily's intention within this activity is to 'cover' the board, it is important to note that this is in contrast to Athey's (2007:139) findings in the Frobel project, where she states that "children's symbolic representations, *containing* and *enveloping* [also] came later than the representations of trajectories."

Filling: 'figurative representation' (12th July 27months)

Emily was standing near the water butt with three other children. She waved and smiled at me as I walked into the outdoor area. I took this as my cue to become involved with the small group of children. We spent several minutes filling and emptying different containers of water, all the children laughed and giggled as it splashed me.

Emily appeared to be very proficient at filling her watering can. She was able to turn on the tap, hold the watering can steady to allow the water to travel through the small hole at the top. Although Emily could not see the water inside the watering can, she obviously understood that it took time for the watering can to fill with water.

Figure 6.68

Filling up

Using two hands to lift and tip the watering can, Emily was able to aim and direct the flow of water from the spout into a range of pre-selected containers. Every so often Emily would stop and look inside the watering can.

Figure 6.69
Emptying

Figure 6.70
Checking

Although it is not possible to know what Emily was thinking, I believe that she understood the amount of water in the watering can was decreasing. Gaining a visual perception of this strengthened her thoughts and understanding of the concept.

After refilling and repeating her exploits with the watering can over the morning, Emily began to also make marks on the blackboard.

Figure 6.71
Finger marks

Figure 6.72
Vertical marks

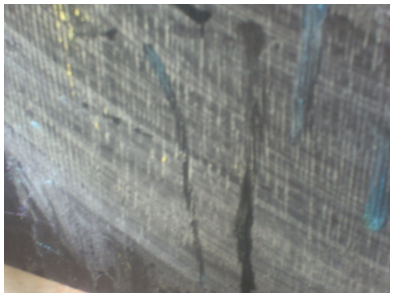

Figure 6.73

Figure 6.74

More marks *Chalk marks*

Emily used a combination of chalk and her wet fingers to make vertical marks on the board. I believe she only used a downwards motion to make these marks, which suggests that the marks were figurative representations of the trajectory pattern of the water as it flows from the watering can to the container.

I believe Emily's intermittent exploits with the water and the mark making activities supported her forms of thought, strengthening her understanding, with each activity driving and consolidating the other.

Discussion

Gardner (1984) characterises "the fine motor movements of one's fingers and hands," together with the "capacity to work skilfully with objects" with that of evolving "bodily- kinaesthetic intelligence" (207). Intelligence is evidenced by Emily's proficiency in filling the watering can and by controlling the water tap, as she continues to display her relentless enthusiasm and persistence in her quest to explore her forms of thought.

In what appears to be Emily's frequent checking of the water level, it seems appropriate to propose that Emily has developed an understanding of the relationship between pouring water from the watering can, and the decreasing levels of water within the watering can. In understanding this relationship, Athey (2007:142) would identify this as a "functionally dependent relationship."
The invisible links between the different content selected and explored by Emily are becoming visible.

- The downward motion of the water as it flows from the water butt into the watering can.
- The vertical movement of the water as it flows from the watering can.
- The downward movement of the water level as it decreases inside the watering can.

Such visibility within Emily's forms of thought suggests that it is not a surprise that Emily is observed using the blackboard to make vertical marks. A logical conclusion would be to assume that these are "figurative representations" of

Emily's forms of thought (Athey 2007:79) and her experience with dynamic vertical trajectory.

Although it is not possible to know, it could be proposed that Emily's real intention with the mark making was to represent the decreasing water level within the watering can. Emily spent time investigating how the water level inside the watering can be altered. Perhaps, when standing at the board, she also imagined the downward vertical mark to represent the water inside the watering can. The lines (mark making) could be considered as a symbolic representation (Athey, 2007) of the decreasing water. Emily could be actively symbolising the decreasing water by making a downward mark. Whilst it is tempting to think that Emily is symbolically representing (Athey, 2007) the decreasing water levels within the watering can, unfortunately the observation does not include sufficient information. However, such spontaneous use of "graphic form" (78) continues to suggest that Emily has a perceptual plan to guide her and support her as a social actor in her own learning.

Enveloping: 'misunderstanding' (14th July 27months)

I had not intended to observe Emily today, however her key worker informed me of Emily's reoccurring interest in mark making. Emily's key worker told me that Emily had been making marks for over ten minutes, repeatedly refilling the cup with water to ensure her marks stayed visible.

Figure 6.75
Preparing

Figure 6.76
Covering

Today Emily seemed to be making curves and ark shapes on the black board with the water. I tried to narrate what Emily was doing, believing I was using language to support her actions. "Emily making marks… big shapes… curved shapes… Emily tipping the water… is the water falling?" I asked Emily what she was doing? She smiled and looked at me and said "cover, I cover … all gone all gone"
I asked what had gone? Emily did not respond to my question. She turned her back to me and returned to the board, continuing with her pursuits of enveloping and covering the board. I took this as Emily signalling that she wished to be left alone.

Figure 6.78
Returning to task

Discussion

Atherton (2013:37) explains that "to talk genuinely with children when they play demands a familiarity which can induce recall and enable relaxed probing."
Emily patiently and politely accepted my attempts at narrating her actions. My intention to provide Emily with "language of form" to help her "embed conceptual understanding" fell short. In my haste and excitement I misinterpreted Emily's actions, subsequently providing a language accompaniment to support a dynamic trajectory interest.
Whilst in many situations at only 27months of age Emily may be viewed as powerless and incapable (Lahman, 2008), it is very evident on this occasion that Emily has both control and an understanding of the situation. Her spontaneous reply "cover, I cover … all gone all gone" reflects her form of thought, her prominent interest at this moment of time – enveloping (Athey, 2007).
Emily's use of 'I' suggests her prevailing control, and her cognitive competence. Emily provides verbal confirmation of her thoughts, her focus. She is not

engaging in a social conversation (Piaget 1959). Instead her dialogue affords her "polite departure" (Athey 2007:252). Emily is informing me that my presence is not required, that she is both competent and capable of continuing without my interference. Fortunately on this occasion my "tactless out of place comments" (Atherton 2013:39) did not deter Emily from her on going pursuits, and from her dominant schematic interest at that moment in time.

Environmental resources: 'insideness' *22nd August (28 months)*

Emily appeared both pleased and excited to see me. She was waiting by the front door as I arrive at her house.

I spent some time sharing and reading stories with Emily before I asked her if it was ok for me to take some photographs of her playing. Emily responded positively, smiling and saying " yes yes yes yes." I showed Emily my camera, together we took a couple of photographs of her books.

Emily seemed reluctant to play without my input. I tried to withdraw from the play and to become an observer. It took some time. With her mother's encouragement Emily became involved in the wooden number jigsaw.

Figure 6.79
Number puzzle

Figure 6.80
Completed

As Emily replaced each piece, she said the number names out loud. Emily's mother confirms, "she knows the number names. You like 8, 9 and 10. You know they go together". On completion, Emily gesturing for me to take a photograph of the jigsaw puzzle.

Emily's interest turned towards her dolls. She expertly removed the clothes from one before placing it in the fabric carrycot placed on the floor. Emily's mother explained, "she is always undressing and dressing her dolls, I have to help with the dressing, but the clothes are on and off constantly."

Figure 6.81
Undressing

Figure 6.82
Tucking in

Emily placed a second doll inside the carrycot, and pulled up the cover to enclose both dolls inside. A few moments later the larger doll was removed and placed inside Emily's pram at the other side of the room.

Figure 6.83
Inside pram

Emily placed her feet inside the carrycot before bending down to sit completely within it.

Figure 6.84

Feet inside

Figure 6.85

kneeling inside

Figure 6.86

Sitting inside

Figure 6.87

Sitting contentedly

As illustrated by figure 6.87 Emily sat contentedly within the fabric carrycot for several moments, moving only to obtain her drinking cup.

After a short while Emily's focus returned to her doll (re-dressed by Emily's mother). Emily again removed the clothing and replaced it inside her toy pram, also placing the second doll and the juice cup inside the pram. Emily determinedly and enthusiastically proceeded to push the pram around the room.

Figure 6.88

Removing clothes

Figure 6.89

Inside pram

Figure 6.90

Moving around

Figure 6.91

Pausing

Emily pushed the pram around the room, skilfully manoeuvring between the chair and the settee. Emily has an obvious understanding of the space and size of the gap. Occasionally Emily paused to take a drink before returning to her purposeful and obviously pleasurable endeavour. Emily's mother remarked, "she is very physical. I noticed this recently at a wedding we went to. At the reception she started dancing, always moving, very natural. She wanted to dance. We could not stop her."

Without any warning Emily finished the game, left the sitting room and headed for the stairs, causing her mother to call "don't play on the stairs" before explaining to me "she likes the stairs – it's all the time with the stairs."
Is Emily trying to tell us something? Her constant fascination with the stairs suggests her continual interest in vertical trajectories. Whilst it is not possible to fully understand it would make sense that after spending nearly twenty minutes exploring horizontal movements, Emily may now wish to extend and alter her investigation to gain more experience with vertical trajectories. Emily came back into the sitting room, climbed on the settee and began to bounce, saying, "I bounce." With a big smile and a cheeky voice Emily's mother says " You are a scallywag today aren't you?"

Discussion

Emily's initial endeavours display continuity with a containing and enveloping form of thought. Her interest and fascination with the jigsaw reflect consistency in Emily's choices of environmental resources across the home and the nursery.

Nutbrown (2011:38) identifies that consistency across "experiences and materials" is a pedagogical underpinning of effective early education.

Emily completes the puzzle with ease, whilst also recalling all the number names. This infers that at only 27 months of age, Emily can competently recognise and use number names. In this situation Nutbrown (2011) and Athey (2007) would explain that Emily's speech, and her knowledge of number names has arisen from her mother's commentary, to support Emily's actions as she repeatedly completes the puzzle. Whilst possibly accepting this explanation for the internal acquisition of the number names. Super and Harkness (2002) would draw links with the mediating and shaping role of family culture suggesting that the home environment and consequently Emily's toys are greatly influenced by individual parental ethno-theories.

Harness and Super's (2002) 'parental ethno-theories' are arguably similar to Nutbrown (2011) and Athey's (2007) use of the term 'pedagogy', in that they have a significant influence over the culture within the learning environment. With regard to the EYFS curriculum (DfE, 2012) Emily's recognition of the numbers 1-10 is an expectation within the age range of 40-60+ months. Emily's ease in successfully mastering the skill of number recognition makes sense when considered in relation to her individual fascinations and forms of thought. It would also seem possible that other young children with similar forms of thought would also be confident with such number knowledge, which raises questions in regards to the relevance and significance of the EYFS curriculum document (DfE, 2012). Nutbrown (2011) also questions the relevance of early curricula, suggesting that "educators can waste time and insult the intellect of young children" (148) advocating that rather than preparing children for school through the use of a curriculum, "Being and behaving as a learner and a thinker is the type of preparation for future learning that children need" (148).

Since my last visit it is obvious that Emily's skill and competence in navigating the pram around the settee has greatly increased. This verifies Gardner's (1984) belief that to establish a level of "mastery" requires evolving "bodily-kinaesthetic

intelligence"(207). While agreeing with Gardner's (1984) beliefs, Nutbrown (2011) also points out that through such practical activities, children also gain greater understanding of many mathematical and scientific concepts such as:

> Capacity, tessellation, spatial order, size, shape, height, angles, perimeter, circumference, numbers, sorting, time, matching, quantity, position, estimation, transformation, addition, length, equivalence, distance, symmetry, properties of natural materials, cause, effect and functional relationships, centrifugal forces, rotation, colour, magnetism, gravity, trajectory, natural science, change and speed (78).

As Emily continues to explore her persistent forms of thought, she too gains greater understanding of mathematical and scientific concepts. This supports the suggestion that it is only through a combination of Emily's cognitive and bodily intelligence that she is able "to judge the timing, force, and extent of [her] movements and to make necessary adjustments in the wake of this information" as she navigates the pram around the settee (Gardner, 1984.211).

6.3 Final thoughts

In this chapter I have used observations and photographs to illuminate how schema can unfold, grow and adapt into new cognitive structures, providing a greater understanding of the mechanisms of cognitive development within young children. Observing Emily over sixteen weeks has provided a unique opportunity to witness both her "cognitive discomfort" and "cognitive confidence" (Athey 2007:51), as she has journeyed on her perceptual plan in an attempt to nourish and grow her schema.

Emily's exploits demonstrate how working with young children in a day care setting is both "complex and demanding" (Nutbrown, 2011:149), and requires adults who are "tuned in to young children's thinking, open to their ideas and responsive to their ever-active minds" (149). However, at times, Emily reveals that even this is not enough!

Before Emily is ready to fully engage in learning, she needs to feel socially and emotionally secure. Taking on the apprentice role (Robert, 2010), Emily illustrates the necessity of the key worker. Only when Emily chooses to venture

from this safe and secure base is she ready to fully engage with the business of learning.

The stories have plotted Emily's cognitive path, as her 'mobile frames,' her schemas (Piaget 1959), have moved forwards and backwards between motor level, functional dependency and possible symbolic representational level (Athey 2007). Emily's intrinsic drive and her motivation have sensitised her selection and use of environmental resources to match her needs, as materials have revealed new and transforming powers. Emily has reached beyond her present understanding to discover and investigate new and unknown concepts. Emily's story portrays and depicts her as an actor in her own learning.

Importantly, Emily's story highlights issues and raises the question of what would be a suitable curriculum for young children? It also reveals parity between Super and Harkness's (2002) parental ethno-theories and Nutbrown's (2011) and Athey's beliefs with regards the role of pedagogy within early education.

In the next chapter George's exploits within the nursery and home environment will illustrate his developing going through and going around schemas

Chapter 7 George

7.1 George's going around a boundary and going through a boundary schema.

George was born on 11th November 2009, making him 29months old at the start of the data collection process. George attends nursery for three full days each week. George is the oldest child. He has a younger brother, who was born earlier in the year. George lives at home with his younger brother and his mother and father. Throughout the research process George's mother was on maternity leave from work.

George's transition into nursery at the start of each session can vary, tending to run more smoothly on the days when his best friend arrives before him. On other occasions he can be reluctant to separate from his mother. Once settled in nursery, George demonstrates a steely determination within his pursuits.

7.2 Narrative observations

Water: 'discoveries' (26th April 29 months)

George was already outdoors in the sand pit when I arrived. I am unsure who had filled a plant pot with sand, but George's attention seemed to be focused on the top of the plant pot, patting the sand down.

Figure 7.1

Digging

George seemed unconcerned by my presence, smiling at me before returning to his task with the sand and the plant pot.
A short moment later, George had a watering can. He appeared to be watering the plants.

Figure 7.2
Watering plants

Figure 7.3
Observing plants

After pausing to look at the plants, George proceeded to run his watering can along the window ledge of the house. As he reached the end of the house, George tipped the watering can, allowing the water to flow onto the floor. Continuing to walk, George made a water trail on the floor. The concentration on George's face suggested that this was not an accidental action.

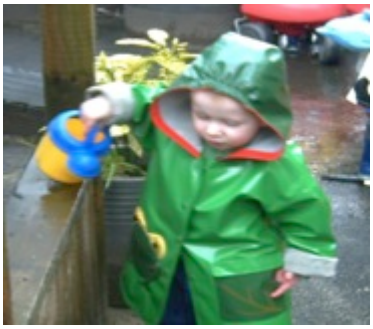

Figure 7.4
Along ledge

Figure 7.5
Water trail

George's actions resemble the familiar actions that would be observed in many children displaying a schematic interest around vertical and horizontal trajectories and containing.
At this moment in time I felt an understanding, even a confidence, with George's forms of thought.

Such confidence was short lived, as I became intrigued with George's following sequence of actions. George turned his focus of attention to the large piece of driftwood.

Figure 7.6
Driftwood log

Figure 7.7
Hollows

With obvious care and attention to detail George attempted to tip water into the small hollows and nooks of the bark (figure 7.8 and 7.9). George appeared to consider and plan where to place the water. As I watched I realised that he was methodically moving around the circumference of the log

Figure 7.8
Water in

Figure 7.9
More water

Throughout the investigation George selected and used a variety of resources from which he was able to tip and pour the water. Each time he had to stop to refill the container, he continued his investigation from his previous finishing place.
I am astonished at the level of accuracy George was displaying. George seemed unperturbed when some of his water seemed to disappear, causing me to consider if his focus was containing? Was George trying to tell me something else? I feel my

initial ideas and confidence with regards to George' s interest was perhaps a little hasty.

While waiting for his lunch, George sat inside a hoop to listen to a story. As he listened to the story, George moved the hoop up and down, raising it above his head, then down to the mat.

Figure 7.10

The hoop

As I pondered about George's actions I observed how he placed himself in the hoop before moving it up over his body. Figure 7.10 illustrates George moving the hoop. George was going through the hoop, going through a boundary. It appeared George was furthering his knowledge of "going through".

Discussion

Atherton (2013: 139) maintains that the ability " to be able to discern children's forms of thinking as they play is a required insight." However, she also warns that in providing an "appropriate accompaniment in learning," the accompaniment may need to be adjusted and modified "in the light of what is seen and heard."

It seems appropriate to suggest George's actions with the sand and the watering of the plants provide evidence of an interest in containing, and in dynamic vertical trajectory. Further evidence of such forms of thought was gained through conversations and photographs of George's earlier experiences at home. George's "patterns of action and behaviour" at this moment in time are the result of his former experiences.

Figure 7.11

Inside

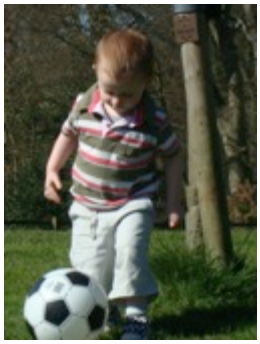

Figure 7.12

The ball

Nutbrown (2011) professes that the perceiving and gaining insight into young children's thinking can only be gained through observation, reflection and a willingness to question. Through pursuing a combination of forms of thought, Piaget and Inhelder (1969: 5) maintain experiences are " treated or modified in such a way as to become incorporated into the structure…In other words, every newly established connection is integrated into an existing schematism."

Atherton's (2013) interpretation would be that as George placed objects inside containers he gained the opportunity to observe the rim, the neck, the boundary of the container, whilst the dynamic trajectory of the object entering the container offered George an opportunity to observe the object going through the boundary. Athey (2007:152) might advocate that it is through the coordination of George's "simple early behaviours" of containing and trajectory that a "more complex understanding" of going through a boundary has evolved. This is a form of thought that becomes evident in George's latest investigations and discoveries.

George's action of passing the hoop over his head would be classified in Athey's (2007: 149) analysis as a "motor level" example of going through a boundary. Other such examples would include "pushing nails through clay," and "pushing one thing through another." If George were attempting to pour water into and through the boundary of the log, this would also be considered as a motor level. Whilst it is not plausible to know his thoughts, his systematic and logical process suggests a higher cognitive level. It is possible that George may have been

thinking 'in this hole the water disappears, it has gone through, in this hole it remains, it is contained.' This implies that George's understanding of 'going through' is functionally dependent on passing through the boundary (Athey, 2007).

By Atherton's (2013: 67) interpretation George would be described as being both "physically" and "mentally active" as he explored the log, arguing that "essential practical endeavour" forms the foundation of future mathematical knowledge (67) and an opportunity to "germinate" (49) future understanding of concepts, such as size, width, height, volume, perimeter, distance and circumference. Such a view resonates with Dowling (2013:2) beliefs about young children's ability to think Dowling considers "thinking is closely linked to early physical and sensory experiences." Meaning young children's thinking is enhanced through supporting the whole child. Such a view has implications for the development of appropriate pedagogy, learning interactions and statutory curriculums for young children.

Water: 'Going through' (10th May 30 months)

George was already busy when I arrived this morning. I said hello and asked, if I could use my digital camera to take photographs. George seemed pleased with this, initially he came to look at my photographs, and gradually as his exploits took over he seemed to forget about me.

George and his friend were tipping and pouring water into the guttering, watching it flow along as it travelled from the top level to the lower level of the guttering. Initially the water splashed onto the ground when it reached the end of the guttering (Figure 7.13).

Figure 7.13

Into guttering

Figure 7.14

Catching water

I am unsure but it appeared the bubbles in the water helped George to see the patterns the water made as it travelled through the guttering. George placed a bowl at the end of the guttering.

Figure 7.15

Noticing

I am not sure when George first noticed, but it did not take long before his attention was captured by the water as it flowed through the gates (figure 7.15) and down the incline of the drive.

Moving from the guttering, George began to tip the water through the gates, George repeated this many times seeming to watch the water as it made its path down the nursery drive.

Figure 7.16

Discovery

George's excitement at this discovery could not be contained. He brought different staff members to watch as he repeated the task for each of them. The adults responded by narrating that the water was going through the gates, supporting George's visual experience and forms of thought.

Later in the morning, when George went inside to get dry, he became engrossed with a set of small wooden rings.

Figure 7.17

Arm through

Figure 7.18

Circular shape

One at a time, George placed the hoops on his arm (figure 7.17). Keeping his arm very straight, he moved the hoops up to the top of his arm. The adult sitting close by narrated George's actions "Your arm goes through the hoops… your arm goes through the round shape of the hoop…your arm is inside the hoop." George made no verbal response, continuing instead to take the hoops off one by one. Selecting some wooden blocks George built a circular shape.

George's invisible threads of thought seem to lead him to discover materials and objects that move and travel from one boundary to another. George's actions and investigations seem to indicate a continuing interest in going through.

Discussion

George began the morning observing the trajectory movement of the water along the guttering. George displays his understanding that, in order for a constant flow of water to prevail, it is functionally dependent (Athey 2007) on more water being added to the start of the guttering. If viewed alone, this observation could be considered as the endeavour of a child with a dynamic trajectory and containing interest. It is only through the adjustment and modification of insight (Atherton, 2013) that the invisible forms of thought begin to reveal themselves. Piaget and Inhelder (1969) would advocate that it is from the coordination of actions, of keeping the water flowing that George determined that the water was passing from one boundary to another, from the jug to the guttering, and from the guttering to the floor. When George placed the bowl he could be perceived as containing the water, or this could be seen as another boundary for the water to pass through. Atherton (2013) advocates that through the actions of exploring, containing and enveloping children are able to learn "about the relationship of going through" (145). George's switching between forms of thought could be considered as part of his "long apprenticeship" (Piaget 1953:320), as he continues to co-ordinate his understanding of going through a boundary with other notions.

George attempts to share his discoveries with different adults who respond to his interests providing suitable vocabulary to match and extend his interest. Nutbrown (2011:70) considers that "extending and developing children's learning through identifying, understanding, supporting and extending their patterns of thinking" is an essential part of the adult role. With an adult alongside providing a speech representation of his actions, George's pursuits indoors with the wooden rings and building bricks can further strengthen his notions of space, shape and going through.

Without the accompaniment of language, George's exploration would be considered as a motor level activity. Constructing a wooden circular structure (figure 7.18) immediately after experiencing the actions of going through the hoop could however suggest that George used the bricks to represent the shape of the hoop. A simple representation of the circular shape would also be considered as a motor level.

Alternatively, considering George's previous lived exploits with the water, it seems pertinent to suggest that George may be using his arm to represent the water as it flows through the boundary of the gate. Piaget and Inhelder (1969) describe that when language is not invented by the child but transmitted in "ready made, compulsory, and collective forms," it cannot be used by the child for self-expression. Instead, the child "needs a means of self expression, that is a system of signifiers constructed by him and capable of being bent to his wishes" (58). One interpretation could be that George used the hoops and his arm to "relive the event," the movement of the water through the boundary of the gate (60). If this were the case, George's exploits with the wooden rings would be considered as a symbolic representation. However without further evidence this must be considered as theoretical speculation.

Sand: 'Going through' (19th May (30 months)

I noticed George sitting alone in the sand area. I moved closer and said hello. George looked up and smiled at me before quickly returning to focus on the tube. He placed his hand and then his full arm into the tube. At one point George managed to put his full arm inside the tube. Next, George proceeded to fill the tube with sand. At times he would pause, appearing to look inside the tube, at other times reaching into the tube with his arm.

Figure 7.19
Filling tubes

Figure 7.20
Sand inside

George appeared very engrossed. I am not sure if he really even realised that his friend had joined him (figure 7.19). George's persistence and involvement in this activity lasted for an extended period of time, unlike his friend, who seemed to quickly loose interest. After watching for a while, it became evident that George was using a combination of sand and shells to fill the tube.

Figure 7.21
Shells inside

Figure 7.22
Emptying

Once full, George lifted up the tube and began to shake it, causing the content of the tube to empty. Gradually, with each shake, the contents revealed themselves as they fell from the tube. Once empty, George repeated this activity many times throughout the morning.

Emptying the tube required vigorous force, as many of the shells were large and had become caught up with each other. This did not seem to deter George. He seemed as interested in emptying the tube as he was in filling it, suggesting perhaps his interest was in the resources moving through the tube.

Figure 7.23

Around table

At the end of the morning, George became involved with a short episode of mark making. Using a coloured pencil whilst walking around the table, George made a line around the edge of the paper. His key worker confirmed that he often did this. George's mark making and his experiences in the outdoors both display evidence of travelling around the edge, going around a boundary. I wondered if George was using his mark making to represent his actions in the outdoors?

Discussion

Unlike sensorimotor intelligence that Athey (2007:50) likens "to a slow motion film in which all the pictures are seen in succession, but without fusion," George's schematic interests, his exploits and experiences are beginning to fuse together through the process of "co-ordination and connection" (Nutbrown, 2011:30). George is developing a more complex comprehension of the environment. As new concepts and schemas develop, George's use of environmental content becomes sensitised (Atherton 2013) to match his newly developing *forms of thought.*

George's use of the sand and tubes does not seem to be a simple containing investigation. His focus appears to be filling and emptying, suggesting an interest in going through. Piaget and Inhelder (1969:66) identify topology as "children's first spatial intuitions", a finding also held by Athey (2007:148), who found that the experience of going through provided children with "elementary topological space notions." When placing his hand, and then his arm within the tube, Atherton (2013:139) would suggest that George is involved in both a "physical

and mental activity" regarding the shape and notion of space. Nutbrown (2011) clarifies that explorations of containing and going through provide young children with practical mathematical experiences of shape, size, rotation and space.
George's knowledge and his mathematical understanding of the shape and space within the tube is founded on his previous first hand experiences, as well as his action and motor level encounters.

It is probable to presume that George understands that his arm is bigger and longer than the shells he selects. If his arm will easily pass through the tube, so should the shells. George's actions in shaking the tube were not uncontrolled or displaying any form of frustration. In contrast, George's vigour in shaking out the content of the tube (Figure 7.22) displays his understanding that the shells will come out, they will travel through the tube. Gardner (1984:18) would consider George to be involved in a process of constructing and hypothesising in an attempt to understand and "figure out the nature of material objects in the world." It seems pertinent to suggest that George is increasing his "elementary topological space notions" (Athey 2007:148). Piaget's (1959:357) notion that "thought consists of internalised and co-ordinated action schemas" implies that George's previous experiences with dynamic trajectories enable him to visualise the movement of the shells through the tube. Whilst it is not possible to fully perceive George's thoughts, Athey (2007: 153) would explain that, as schemas co-ordinate, George is developing "systems of thought."

In the absence of speech and with no clear understanding of George's thoughts, his endeavours at mark making would be considered by Piaget and Inhelder (1956) as a figurative representation of his sensorimotor movements. Over time, as more insight into George's thinking is gained, these ideas may need to be adjusted and modified "in the light of what is seen and heard"(Atherton 2013:139).

Athey (2007:50) deems that "as schemas are coordinated into more and more complex amalgamations the environment is comprehended at a higher level,"

meaning that George continues to match content to his new more complex forms of thought. Through his busyness, and his daily explorations in the real world, George's intrinsic schematic motivation has become the driving force behind his learning. At the age of 30 months, George can already be considered as a confident and capable actor in his own learning (Nutbrown 2011).

Cars: 'Movement' (11th June 31 months)

When I arrived at George's house, he was busy playing with his garage on the living room floor. George seemed undeterred by my presence. I showed him my camera and asked if it was ok to take some photographs of him playing.
George was placing all his toy cars in a row on the road within the garage (figure 7.24). Once ready, George allowed the cars to travel down the slope.

Figure 7.24
A cue

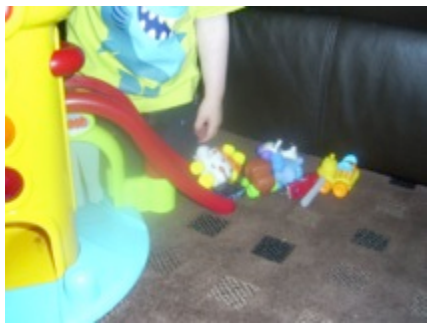

Figure 7.25
Down slope

George seemed interested in the vertical trajectory movement of the cars. One at a time he pushed them back up the slope and let them roll down again.

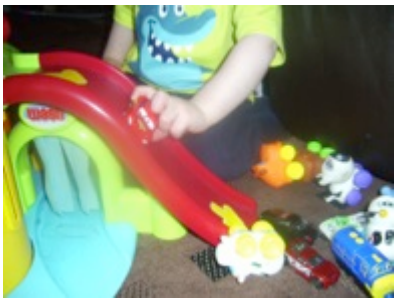

Figure 7.26
Up the slope

George repeated this many times. For a short time George became interested in his Thomas train. George could make the train travel along the carpet. When he pulled the train backwards, the mechanism within the train independently moved it forwards.

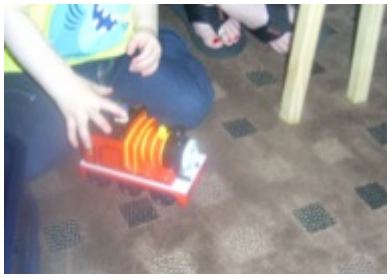

Figure 7.27
Across

Figure 7.28
Hitting cupboard

The train travelled across the carpet until it hit the cupboard. This seemed to please George, as he smiled and laughed. George repeated this many times.

In time George's focus returned to the garage. He seemed to have noticed that some of the features were missing. George competently slotted in a parking sign. The parking sign formed an arch over the road (figure 7.29). Before sending a car down the road and under the sign (arch), George used his arm, sliding it under the sign and down the road.

Figure 7.29
The arch

Figure 7.30
Testing

Figure 7.31

Through

George watched the car as it travelled down the road and through the arch. From his box of toys, George selected a pre-built plastic archway. He placed this at the top of the garage and then proceeded to send cars through it.

Figure 7.32

Another arch

Figure 7.33

Car through

George's focus and his thoughts appeared to have moved on from that of trajectory movements. The addition of the arches enabled George to also experience 'going through'. George seemed to have combined his interest and understanding to initiate a new experience.

Figure 7.34

Putting away

George's toys are organised into collections and stored in boxes. With a little help from his mother, George put away the cars and selected the farm set to play with.

It was interesting that at this point in time George displayed no interest in the farm animals. His whole focus was directed at the fence. It took obvious skill and perseverance to connect the fence pieces together. George spent the remainder of my visit building the fence.

Figure 7.35

Connecting

Figure 7.36

Inside

Figure 7.37

Circular boundary

Figure 7.38

Increasing size

The fence appeared to resemble a circular boundary shape (figure 7.37). Initially George erected it around himself, before moving outside of it. Figure 7.38 demonstrates George's understanding of how to increase the size by adding more parts. As he had no fence pieces left he added farm structures. George's mother explained that he enjoys building the fence but that he does not really play with the farm.

Discussion

George's initial activities (Figures 7.24 – 7.28) suggest further exploration of motor level dynamic trajectory schema, fitting with Nutbrown's (2011:29) "notion of schemas revisited." Whilst George does not seem to be revisiting these schemas at higher level, it may be that through revisiting he is able to continue his "long apprenticeship" (Piaget 1953:320), clarifying and consolidating his understanding of "the nature of material objects in the world"(Gardner 1984:18).

Athey (1990:70) reiterates that "operations that can be carried out in the head" are initiated from "sensory and perceptual information accompanying motor actions." Figures 7.29- 7.33 provide evidence of George's continuing interest in going through. Athey (2007:148) interpretation of George's actions may suggest he is testing his "notions" of shape and space, and his "topological" knowledge with the use of his arm. Perhaps such physical explorations provide George with a strong perceptual feedback, enabling him to successfully accommodate and assimilate information into his forms of thought, his going through schema. Johnson (1987:19) believes that schemas are "embodied patterns of meaningfully organised experiences" explaining "image schemata" exist as "structures that organise our mental representation"(23). This implies that as George continues to experience, to feel, and to gain an embodied perception of going through, he is continuing to develop his internalised understanding of going through.

If George's desire is to increase his perceptual understanding of going through, he recognises that a deeper understanding would be gained through using his

bodily (kinaesthetic) perception, reinforcing Neisser's (1976:56) proposal that "schema is a pattern of action, as well as a pattern for action."

George's persistent interest in constructing the fence could be evidence of his containing and enveloping interest. However, Atherton's (2013:139) suggestion of adjusting and modifying ideas "in the light of what is seen and heard" resonates with this observation. If George's form of thinking was containing, there is an expectation that he would place objects within the constructed space. George persisted in what was an obviously tricky job of connecting the panels together, yet he seems uninterested in using the construction as a container or in order to contain. It appears that George has constructed a three dimensional representation of a boundary, an enclosure, suggesting an interest in the relationship of surrounding.

Whilst it is possible to assume that George's interest in surrounding has occurred through the co-ordination of his schemas, it is not possible to fully perceive, whether George has a full understanding of three-dimensional space. Athey's (2007: 136) interpretation of these actions would be that George's interest in surrounding is "simpler" and not the co-ordination of "the three topological space schemas: surrounding, enclosure and going through." Implying through these exploits, George is able to build on his previous experiences and expertise, his " long apprenticeship" (Piaget 1953:320). Although George's actions would be catogorised at a sensory motor level, Athey (2007:51) interpretation of George's actions would seek to serve as a reminder that what is "known" leads to what becomes "better known."

Indoors: 'Pushing' (22nd June 31 months)

Figure 7.39
Ball play

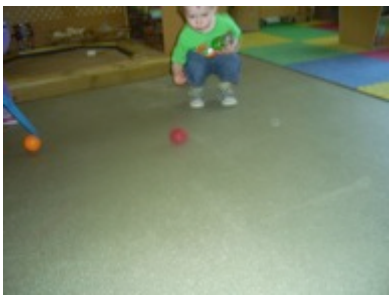

Figure 7.40
Rolling balls

George was alone indoors this morning. He seemed uninterested in being with his friends, who were all outside. He told me "I have balls… I can do big push" as he proceeded to roll the balls across the floor towards me. I returned (rolled) the balls to him. We repeated this several times. I narrated the actions of the balls as they rolled: "ball coming to George… I give it a big push…the ball is rolling toward George… George stop the red ball." George said the colour of each ball as he expertly rolled them back to me. On occasions he told me "it's a big push."

Figure 7.41
Rolling through

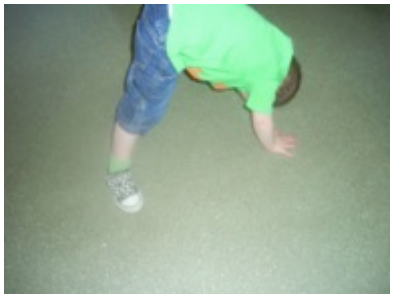

Figure 7.42
Through again

As George attempted to stop a ball using his foot, it rolled between his legs. This seemed to provide George with a new direction of play and exploration. Seeming to forget about me, George attempted to roll the balls through his legs (Figure 7.41). For a few moments George was captivated and mesmerised with this new experience, seeming to forget about my presence or participation.

I feel I am beginning to "come to know" George a little (Atherton, 2013:158). Once again he has extended a dynamic trajectory interest into a 'going through experience.' I think perhaps George became a little dizzy, as his perseverance on this occasion was short.

Figure 7.43
Filling

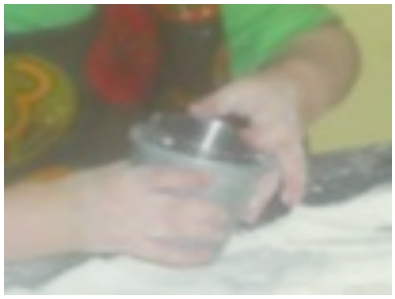

Figure 7.44
Fitting

George joined a small group of children at the messy tray. With little hesitation George began to fill a small container with flour. Almost knowingly, George placed a smaller container inside his first container; it fitted perfectly with the two rims becoming parallel (figure 7.44). George appeared to explore this several more times, placing the smaller container in and out.

Figure 7.45
Containing

Figure 7.46
The rim

George returned to his initial interest, filling the containers with flour. Once full to the rim, George pushed a finger into the flour, making a small hole.

Figure 7.47

Pushing into

George appeared almost spellbound, as he gently and cautiously pressed his finger into the flour.

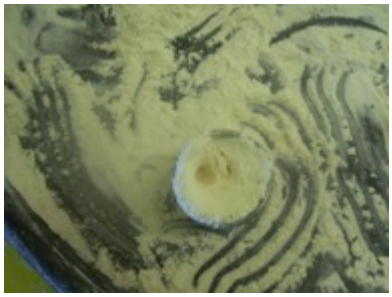

Figure 7.48

A hole

Discussion

Across George's life, he has spent much time exploring how balls behave. Atherton (2013), Nutbrown (2011) and Athey (2007) all agree that sensory and perceptual information accompanying motor actions leads to higher levels of understanding. It would appear George is now able to recognise the relationship between 'a big push' and the distance the ball travels, implying his understanding that the movement of the ball is functionally dependent on the force and the type of push the ball is given (Athey 2007). George's accompanying language suggests that he is able to anticipate the movement of the ball before it happens. He understands that a "big push" will cause the ball to travel far before he actually carries out the action. His "internalised and co-ordinated action schemas" suggest that George is able to carry out this thinking in his head before he completes the action (Piaget 1959:357).

Using his legs to form a boundary through which the ball can travel, is what Nutbrown (2011) might interpret as George creating his own continuities, affording further opportunity to explore, think and learn, and to test his ideas of functional dependency. George's schema depicts him as an actor in his learning journey. George's own intrinsic schematic motivation becomes "a pattern for action" (Neisser 1976:56), allowing George the opportunity to re-test his understanding. Whilst it seems that George quickly re-establishes the functional dependency relationship between the ball and the distance travelled, in the absence of speech there is no evidence to suggest what George is thinking as he does this (Athey 2007).

George's actions illustrate Nutbrown's (2011:46) belief that "schemas can be considered at the core of children's developing mind." George has his own perceptual plan to support his learning, at only 32 months old many adults would find it hard to accept that George is able to systematically plan and select content from the environment to match his forms of thought. Nutbrown (2011: 46) affirms that children's 'threads of thinking ' "connect different areas of content," meaning that George's selection of environmental content is not haphazard or a coincidence, but based on an informed and systematic cognitive plan.

Atherton's (2013) interpretation of George's play with the flour and containers might be that it continued to reveal his coordinated schematic explorations. His actions of containing flour and containers within each other suggest a schema of containing and enveloping. His evident interest in the rim of both containers suggests that he is learning about the relationship of going through the boundary, and about putting things inside. Pushing his finger into the flour might be described by Athey (2007) as a further motor level example of going through.

In considering George's attempt to use the flour to make graphical marks, Athey (2007) reminds us "most early marks are figurative outcomes of bodily movements" (78). However, as Atherton (2013:139) points out, "in the light of what is seen and heard" it is plausible from George's previous experiences with

coloured pencils (Figure 7.23) and constructing a boundary (figure 7.35 – 7.38), to consider that George is now using the marks in the flour to represent a boundary. Atherton (2013:49) may consider it as an "erroneous characteristic" of George's "thinking," yet further speculation makes it reasonable to postulate that George's going through and surrounding schemas are co-ordinating, crediting George with advancing "topological space notions"(Athey 2007:148) and leading to an exploration and interest in concentric boundaries. This is a possibility confirmed by George's mother as she describes his developing interest and knowledge of shapes: "Yes he knows all shape names, he knows everything, all the shape names, he just remembers them and uses them when he plays" (home visit, 18th August).

The log: 'Going through' (5th July 32 months)

Many staff members have told me that George has become fascinated with the log, explaining he spends time each day attempting to pour water into it.

Figure 7.49
Fascinated

Figure 7.50
Looking

I observed George for over twenty minutes as he continued his daily exploration of the log. At times the investigation was extended to pushing a finger into the hollows of the log.

Figure 7.51

Filling

Figure 7.52

Pushing

George meticulously and methodically selected a variety of containers from which he precisely poured small amounts of water into the hollows of the log.

Figure 7.53

Searching

Figure 7.54

Testing

Such accuracy cannot be incidental. It suggests that George was testing and hypothesizing as he continued his fastidious investigation of the log

Figure 7.55

Hypothesis

Discussion.

George's going through schema appears to continue to drive his actions (Neisser, 1976). His perceptual plan for cognitive continuity involves exploration, reptition, mastery and revision. George can visually see the hollows and holes in the log. Possible in pushing his finger in to check he perhaps gains a stronger perceptual feel. He pours water in, and he watches the water disappear. Through such play, Wood and Attfield (2005) believe children gain "powerful tools for making sense of the world" (122).

In the absence of language and an understanding of George's thinking, such actions would be classified in Athey (2007) analysis as motor levels. Yet his thought, his persistence, his level of involvement (Laevers 1976) infers a higher level of learning. The complexity of George's thinking cannot be underestimated, as Nutbrown (2011: 86) reminds "mathematics it seems is never far away from young children's actions." Through the physical and mental involvement of this activity George is gaining early and valuable experience of size, shape, position, height, speed and equivalence. Moylett (2010) contends that opportunities for such discovery are vital, not only to build the foundations of mathematical understanding but also to support children's dispositions and inclination for life long learning.

Going through; 'Hypothesising' (12th July 32 months)

I was surprised, as this morning George's investigations with the log seemed to have a different structure this day.

Figure 7.56

Water in

Figure 7.57

Walking around

George proceeded to pour water into the log. He then walked around the log (figure 7.57), while keeping his whole attention focused on it. I observed George repeat this three times. I was unsure as to what he was doing. Was he looking for water?

I asked him "where has the water gone?"

George made no verbal response. He ran away and quickly returned with a bucket. George placed the bucket next to the log.

Figure 7.58

The bucket

Figure 7.59

Catching water

I was amazed at George's thinking. I asked him "what is the bucket for?"

George stood and looked at me, then replies "for the water, I get the water."

I believe George's intention was to collect the water in the bucket, just as he had previously done with the guttering (figure 7.14). As the outdoor area became busy with other children, George seemed to loose his focus and became embroiled in a chasing game with his friends.

I was intrigued to watch George a little later in the morning, as he explored the sand indoors.

Figure 7.60

Inside

Figure 7.61

Through

George had a funnel. He tipped sand into the funnel and watched as it flowed out. George was able to strategically place resources to catch the sand as it flowed through the funnel.

Figure 7.62
Flowing out

Figure 7.63
All gone

George repeated his actions many times, seeming to test and re-test his ideas and understanding. He watched the sand as it flowed from the bottom of the funnel.

Figure 7.64
Re-testing

George observed the sand inside the funnel as it flowed out.
I watched George for nearly ten minutes before I asked, 'where is the sand?' George made no verbal response. 'Does the sand go through the funnel?'
George pointed to the sand pit 'I catch the sand'

Was George wondering why the water and the log do not behave in a similar way to the funnel and the guttering? I feel compassion for George as he attempts to make sense of the world, however I feel confident I also have a foundation from which I can "come to know" his thoughts (Atherton 2013:58).

Discussion

Through his extended explorations it is feasible to consider that George has recognised "patterns and relationships" within the log (Wood and Attfield, 2005: 122). If such an assumption is correct it is also plausible to believe George has gained understanding of the functional dependency relationship between water going in and coming out. Athey (1990:70) points out that children's understanding of functional dependencies "arises from the application of earlier schematic behaviours". George's previous motor level experiences of containing and going through a boundary have afforded his understanding that what goes in will also come out. If he pours water in it will pass through and then re-appear. From a mathematical perspective it can be judged that George is gaining an understanding of capacity and conservation.

Piaget and Inhelder (1969:20) identify reversibility as the source of "future operations of thought," explaining "the most immediate result of the reversibility structure is the formation of notions of conservation." Without further evidence it is difficult to identify George's distinct level of understanding, but it is becoming more apparent through the co-ordination of schemas that George is experiencing several higher order concepts. George's actions could also be considered as illustrating Piaget's (1959:357) notion that "thought consists of internalised and co-ordinating action schemas." In placing the bucket to "*get the water,"* George has demonstrated that he is able to foresee that he should be able to collect the water.

Athey (2007:192) considers knowledge as an "end point," identifying that it is produced through a continuum from "struggle to playfulness." It distinguishes children's "desire to master some perceived problem" as the starting point, the "struggle". George's fascination with the log initiates his problem. Possibly resulting from his developing functional dependency understanding of water passing through a boundary. Whilst it is not fully possible to comprehend Georges thinking it would seem he believes that it is possible to re-contain the water as it exits the log, hence his placing of a bucket. Athey's (2007:192)

"struggle" resonates with Neisser's (1976:56) "pattern for action" as both can be considered as intrinsic self-motivation.
It is also plausible to consider that when George is not able to re-contain the water, the reversibility of his action to re-collect the water (Piaget and Inhelder, 1969), George experiences a level of "cognitive discomfort" (Athey: 51), an emotion he seems to demonstrate in his behaviour by quickly loosing interest in the activity.

George's intrinsic motivation, his "struggle" (Athey, 2007:192) and his "pattern for action" (Neisser 1976:56) reappear later in the nursery session. Possibly as an attempt to clarify and consolidate his understanding of "the nature of material objects in the world" (Gardner 1984:18), George matches content to his thoughts on passing through a boundary with his use of the sand. This verifies Nutbrown's (2011:46) belief that "children's persistent thoughts involve children [in] creating their own continuities." It may be that through such continuities George is able to continue his "long apprenticeship" (Piaget 1953:320), clarifying and consolidating his understanding of high-level mathematical concepts and "the nature of material objects in the world"(Gardner 1984:18).

Going around: 'Journeying' (14th July 31 months)

George waved and shouted hello when he spotted me this morning.

Figure 7.65
The bike

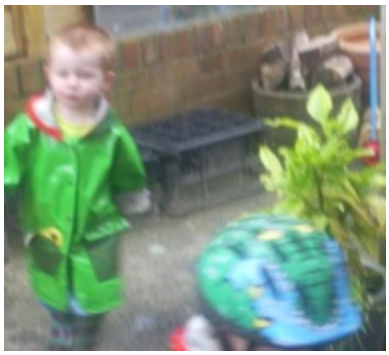

Figure 7.66
Moving around

He appeared very focused in his journeying around the outdoor area. I wondered what he was discovering on these voyages. His use of the bike, his feet to run on and the pram to push must all have provided a different experience and perhaps a new discovery.

Figure 7.67
Pushing pram

I was intrigued to watch as George used the bubbles.

Figure 7.68
A trail

Figure 7.69
The journey

George seemed to use the bubbles to leave a trail, a record of his journey around the space of the outdoor area.
Was George trying to use the bubbles to record his path, to provide a visual representation of his journey around the space?

I was not surprised when I spotted George at the blackboard making marks.

Figure 7.70

Making marks

Discussion

Nutbrown (2011:42) warns that the curriculum for younger children, such as those of George's age, needs "careful consideration" with a "clear understanding of what is meant by continuity and progression." George's involvement, and his busyness imply that he has his own ideas about continuity and progression. According to Nutbrown's (2011) interpretation George can be said to have previously demonstrated continuity through his "persisted threads of action, representation, speech and thought" (46).

Following on from Atherton's (2013: 145) belief that "Gregg's going through" behaviours developed from a co-ordination of his containing and enveloping schema, it is logical to assume that George's behaviour of exploring boundaries is as a result of the co-ordination of his dynamic trajectory and containing schemas. George appears to confidently and capably match his threads of thought through a variety of environmental content. His use of the bike, the pram and running to explore the boundary of the outdoor environment are all examples.

Making the journey in different ways and on different modes (bike, pram and running) will provide George with additional kinaesthetic information. Gardner (1984) and Johnson (1987) state that by using different bodily motions to explore, perceptual understanding can be increased. Meaning it is plausible to argue that by travelling around on the bike, George will gain a different understanding of the speed it takes to traverse the circumference of the area. By pushing the pram, George may become more aware of the bumps and lumps on

the floor due to the pram's poor suspension. In the absence of speech, Athey (1990: 68) would consider that George's varies journeys around the outdoor area "do not appear to have representational significance" and would characterise them as motor level actions.

In light of George's previous use of content to represent boundaries (Figures 8.22, 8.37 and 8.47), Nutbrown (2011) may view George's actions with the bubbles as a further continuity of his thought. This makes it conceivable to suggest that the bubbles represent his journey around the outdoor area. Without further knowledge it is difficult to analyse the meaning and representations of George's bubble trail and his marks on the blackboard beyond a motor level activity. What can, however, be deduced is George's ability to get on "with the business of learning," when he is free to build his own continuity and progression (Nutbrown 2011:39). George's occupations present him not only as an "active and independent" learner (40), but also as a social actor in his life.

Developing mastery: 'Going around' (18th Aug 32 months)

George seemed a little unsure of my presence at his house today. I tried to give him time and space. I held his little brother and spent some time chatting with his parents.

In time, George appeared to accept my presence, bringing his magnetic drawing toy to show me.

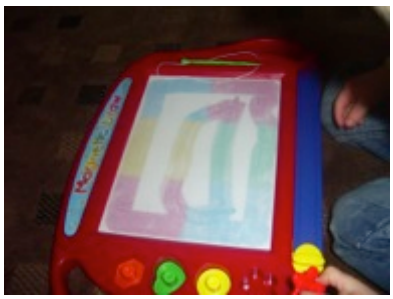

Figure 7.71

Patterns

Figure 7.72

Shapes

George easily and quickly produced patterns and shapes with his drawing toy. George's mother shared his drawing pad with me, I found the obvious similarity between his mark making endeavours startling (7.72 and & 7.73)

Figure 7.73
Drawings

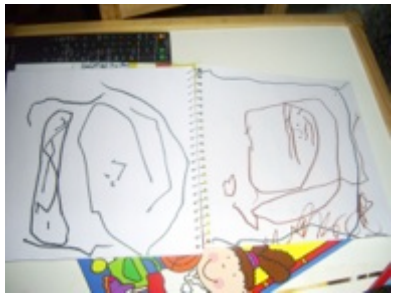

Figure 7.74
More drawings

Georges mother explained that recently when she had asked George to put some kisses (X) in a birthday card, he had become upset. The situation had been resolved through George drawing a smiley face inside the card.

George's interest in using the fence to construct a boundary remained in evidence, however his ability and building technique have greatly evolved. This time it took George only a couple of minutes to effortlessly construct.

Figure 7.75
Fixing

Figure 7.76
Completing

Once the construction of the fence panels was complete, George set about placing all the animals inside the farm buildings. George narrated his actions "In you go," as he meticulously placed the animals within the farm buildings.

Figure 7.77

In you go

After placing all the farm animals back into their storage boxes George's attention turned to his Lego.

Figure 7.78

Getting ready

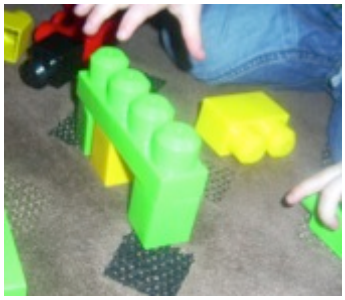

Figure 7.79

Building

George informed me that he was going to "build a house." He seemed happy to let me help, together we searched for the right sized bricks.

Figure 7.80

Bricks

Figure 7.81

House

As George connected the Lego pieces together, he shared his thoughts and ideas on his construction "A house… I build a house… you help me…need a window…the door is here"

Figure 7.82

Big house

George was orderly and methodical with the construction, taking his time. Selecting the correct brick sizes, he built, systematically completing one full row at a time. George's involvement continued. I had to leave George to continue with his house-building project without me.

Discussion

Nutbrown (2011: 46) argues that it is only through "looking closely" at children's actions that "cognitive connections" can be recognised. George's "cognitive connections" across the boundary of the nursery and his home remain visible. Although the content varies, his play environments provide opportunity for "continuity" and "progression" of thought within his schema.

George's obvious enjoyment and pleasure with his mark making endeavours is apparent through his eagerness to share and the numerous sheets. Although at this point of time George is unable to verbally share his thoughts through spoken words, Atherton (2013: 74) would perhaps infer a link between George's forms of thought, his interest in his surroundings, his going around a boundary and his "mark making." This implies that George is able to replay the movement patterns in his mind and represent them figuratively as marks.

George's forms of thinking over the last 16 weeks have revealed themselves through his actions and exploration of water, tubes, sand, logs, bikes, prams, Lego and farm sets. Athey (2007: 51) attributes such practice and repetition with high levels of cognitive confidence and knowledge that has been "well assimilated". It is from "the fruits of his past encounters" that George is able to create his future success as a skilful and playful mark maker (Atherton 2013: 52).

Close analysis of George's mark making illustrates a developing mastery of his fine motor skill (Gardner 1984), providing evidence of both straight and curved lines. Yet when asked to draw a kiss (X), a structure consisting of two straight trajectory lines, George was un-compliant. A possible explanation for such agitation could be explained by Athey's (2007: 78) belief that "most early marks are figurative outcomes of bodily movement." This means that George understands that his marks and his graphical combinations of curved and straight lines have a figurative correspondence to his experiences, his movements and his forms of thought, his lived experiences. When asked to draw the symbol for a kiss (x), George was unfamiliar with this representation, this "new knowledge" (51) that did not fit within his cognitive structures and his schemas. George's behaviour within this task resonates with being placed within a level of "cognitive discomfort" (51). Athey (2007:51) classification of such an experience describes the child as being placed within a functional level of a "struggle".

George now takes only a few moments to construct the three-dimensional boundary of the farm fence. Nutbrown (2011: 47) explains that through "the gradual evolution of schemas and the extension of early forms of thought," children form new ideas, and understanding. For George such understanding, together with his developing "bodily intelligence", his developing "mastery" of his finger movements (Gardner 1984: 207), has ensured George's journey "through the functioning ranges from struggle through to practice to play." This means that today George can complete with casual ease what used to be considered a tricky task.

George's placing of the animals, together with his accompanying speech *"In you go"* imply that his use of speech is not as a social tool (Piaget 1959:17). George's aim seems not to be the engaging in a social conversation but rather his use of speech is to "accompany to reinforce" his actions. Conversely with the Lego it could be suggested that George moves to a symbolic level, assimilating reality to self (Piaget and Inhelder 1969:58), demonstrating his transition from representation of action to representation of thought. Accompanied by speech (symbols), George uses his knowledge of going round a boundary to recreate a house. Within his thoughts George is able to transform the plastic Lego bricks into a house with windows and doors. His ability to involve others and give instructions demonstrates his developing use of speech as a social tool (Piaget 1959). Atherton (2013:64) describes Henry's activities with a ball. Although she does not provides a specific age, there is parity in both Henry's and George's use of language:

> Henry exchanged his thoughts with others and attempted to manipulate the behaviours of others in drawing the adult into assist him in his play, his schematic endeavours (64).

Athey (2007:152) uses the term "precise language," whilst Atherton (2013:64) refers to the phrase "dialogue of conceptual correspondence." However, both agree that young children's language is further supported through accompanied language that matches forms of thought. George's parents at this time had been considering moving house. How much of these conversations George was privy to is unknown, but such a match with his forms of thought would certainly have provided opportunity for George to assimilate appropriate language.

7.3 Final thoughts

In this chapter I have illustrated how schemas support an individual child's thinking, as well as his cognitive development, illustrating the high level concepts the young child 'came to know' when allowed to follow his own intrinsic motivations. George's story demonstrates that through the use of open-ended opportunities to explore and create *he* is able to make important cognitive

links, which help to clarify and consolidate his understanding of "the nature of material objects in the world" (Gardner 1984:18).

Many examples of George's own ability to recognise continuity are acknowledged, as he strives to form new ideas and gain a greater understanding though the co-ordination of his schemas. The chapter provides an opportunity to observe George's changing cognitive structures, his "development of conceptual" knowledge (Athey 2007: 29), as his previous experiences co-ordinate to form new knowledge and understanding, new forms of thought. Through previous experiences with dynamic trajectory, as well as containing and enveloping, George's new interest of going through a boundary and going around a boundary are revealed.

Over the 16 weeks, the observations provided a window into George's lived experiences, his play as he goes about his daily business of constructing and hypothesising through fitting content to his schematic threads. George's story has a strong resonance with Atherton's (2013:139) warning that "the correlations, associations and relationships in children's thinking, revealed in their play, cannot be understood unless those observing have a conceptual awareness of what is seen." Viewed independently, each individual observation provides only a fleeting glance into George's thinking. A conceptual awareness of George's forms of thought is not enough, the observer also needs a willingness to adjust and modify ideas "in light of what [was] seen and heard" across the boundaries of space and time.

George's schema is proven to be a powerful tool in his journey to cognitive competence. His intrinsic self-motivation is exposed as both "his pattern for action" (Neisser, 1977:56) and through his "struggle" within his desire to master his fascinations with the log (Athey, 2007:192). The observations reveal George's developing mathematical notions of conservation and reversibility (Piaget and Inhelder, 1969). Still only in his third year of life, at 32 months of age George's notions and understanding of high-level mathematical concepts will continue to remain invisible, if young children are to be measured only against

curriculum outcomes. George's story provides further evidence to support Nutbrown (2011) and Athey's (2007) argument that the driving force in developing curricula for young children must be pedagogy.

The following chapter will draw together the four children's stories to provide a summary and overview of the key findings of this thesis.

Chapter 8

Conclusion - Coming to know

This concluding chapter reviews the key findings from the study, considering the contribution they make to new knowledge, and future direction for further research. The chapter is divided into three sections. The first section considers the key findings from this study, reflecting on and reviewing answers to each of the six research questions. The second section highlights the original contribution to knowledge arising from this thesis. Finally, the third section proposes directions for further research.

8.1 Key findings

This research project set out to answer the following questions:

12 What does a two-year-old child's schema look like?

13 How do schemas support individual young children's thinking (cognitive development)?

14 Do schemas translate and transform across different boundaries of a young child's life?

15 How do social and cultural influences influence children's schemas?

16 To what extent does schematic behaviour contribute to young children becoming social actors in their own life?

17 What kind of environment and pedagogy can support children's schematic explorations and development?

Answers to these questions will be considered in relation to the narrative accounts of Abby (2.0), Hannah (2.4), Emily (1.11) and George (2.4), presented within Chapters 4-7, they are not generalizable, but taken with the literature they add to a growing body of evidence on children's schemas their learning and behaviour.

1. What does a two-year-old child's schema look like?

The four children's stories present schematic examples of:

- Dynamic back and forth
- Dynamic vertical & horizontal
- Containing and enveloping
- Transporting
- Going through a boundary
- Going around a boundary

The following examples articulate and illustrate what a two-year-old child's schema looks like within the findings of this thesis. Drawing from the four children's exploits an example is provided to illustrate each identified schema and inferred functional level.

Dynamic back and forth schema (Chapter 5)

Hannah's repeated movement around the outdoor area using the car and the bike demonstrating a form of thought (Nutbrown, 2011) representing a motor level dynamic back and forth schema (page 101). Further examples of Hannah's back and forth schema are illustrated as she skilfully pushes and pulls the toy truck along the TV table in her home.

Figure 8.1

Pushing

Figure 8.2

Pulling

Hannah's actions suggests a recognition of the relationship between the amount of force and the distance the truck will move implying a functional dependency level.

Dynamic vertical schema (Chapter 4)

The motor actions of a dynamic vertical schema are illustrated through Abby's whole bodily exploration of the vertical descent of the slide (page 77).

Figure 8.3

Down the slide

Figure 8.4

Walking

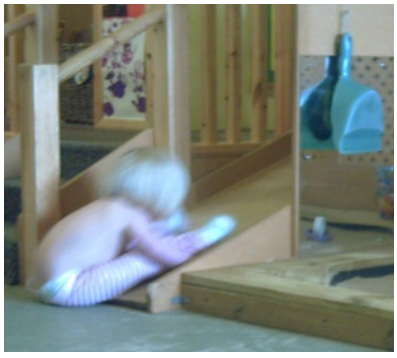

Figure 8.5

Backwards

Dynamic horizontal schema (Chapter 5)

A dynamic horizontal schema is displayed as Hannah pushes, pulls, slides and rolls the large soft play shapes around the floor before finally arranging them in a row (page 130). Hannah further demonstrates her knowledge and understanding of horizontal trajectories as she crashes the toy car into a pile of bricks.

Figure 8.6

Crash

Figure 8.7

Big crash

Hannah uses her knowledge of the action together with speech to provide a commentary of what will happen, so demonstrating dynamic horizontal trajectory at a thought level (Athey 2007).

Containing and enveloping schema (Chapter 4)

Abby's involvement and actions with the play dough illustrates a form of thought (Nutbrown, 2011) representing a containing and enveloping schema (page 71). On other occasions Abby is observed exploring her containing and enveloping schema through the use of different content, her hands and water. Additionally Abby's home experiences, provide a further illustration of her containing and enveloping schema, as she proceeds to cover her legs in jigsaw pieces and hide her head inside a red storage block.

Transporting schema (Chapter 6)

Emily's repeated action of moving water and different nursery toys from one point to another around the environment, demonstrates a form of thought (Nutbrown, 2011) representing a transporting schema. In her home environment Emily is frequently observed using her toy pram to transport toys around her living room (page 174)

Going through a boundary schema (Chapter 7)

George's involvement and actions with the water and guttering illustrates a form of thought (Nutbrown, 2011) representing a going through a boundary schema (page 184).

Figure 8.8

Discovery

On other occasions George is observed exploring 'going through' forms of thought in his use of different content, water and the log, sand and cardboard tubes. George's interest in going through is considered as a co-ordination of his previous "simple early behaviours" of containing and trajectory schema (Athey 2007:152).

Going around a boundary schema (Chapter 7)

George rides the bike, pushes the pram and runs repeatedly around and around the edge of the outdoor nursery area, illustrating his interest in going around boundaries. In the absence of speech to further clarify his intentions, such actions would be considered as motor level (Athey 2007). A further example of going around a boundary is evidenced through George's use of the Lego to recreate a house structure.

Figure 8.9

House

His use of speech to explain the need for windows and a door concludes George is on this occasion operating at a symbolic level (page 212)

The stories of Abby, Emily and George also depict the links between actions and mark making, providing evidence of how two-year-old children's schemas can also be observed in their mark making endeavours.

Schemas and mark making (Chapter 4 & 6)

Abby is observed using chalk to make figurative representations of her dynamic vertical trajectory schema: in the absence of speech, Athey (2007) would deem this as a motor level activity (page 93)

Figure 8.10

Blue mark

Figure 8.11

Another mark

Emily is observed making chalk marks on the blackboard. In light of the lack of evidence, this would also be categorised at a motor level; however, a plausible

argument is made to illustrate what a symbolic representational level would also look like (page 167).

Figure 8.12
Finger marks

Figure 8.13
Vertical marks

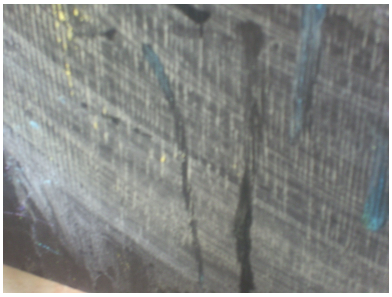

Figure 8.14
More marks

Figure 8.15
Chalk marks

The individual observations present a snap shot of what four two-year-old children's schemas may look like. Chapter's 4, 5, 6 & 7 charts how schemas unfold providing the reader with illustrative and narrative examples of a two-year olds schema. Viewed as full stories, the observations illustrate how two-year- old children are "sensitised" (Atherton, 2013:50) by their environment, to select further content to "match and nourish" (Nutbrown, 2012) their schematic threads of thought. The four children's stories illustrate the different functional levels of a two-year- old child's schema through motor level, functional dependency and symbolic play.

In summary, the illustrated narrative accounts provide many examples of the complex and unique way two-year-old children pursue their threads of thinking (Nutbrown, 2011) and their schemas.

2. How do schemas support four individual young children's thinking?

The four children's stories illustrate how children's individual schematic threads reveal themselves as intrinsic motivation. As Neisser (1976:56) concluded, "schema is not only the plan but also the executor of the plan. It is a pattern *of* action as well as a pattern *for* action". Through the schematic exploration of environmental content, children's new experiences are assimilated within their schemas, so providing a greater depth of knowledge.

For example: In Chapter 4 **Abby's** interest in containing and enveloping influences her explorations resulting in her enjoyment of playing pee-po from inside the red box (page 82).

Figure 8.16

Head inside

Figure 8.17

Walking

On other occasions this same form of thought causes Abby to explore the properties of other resources (page 90)

Figure 8.18

Inside net

Abby's endeavours enable her to continue to build her knowledge and understanding her expertise about the physical properties of different materials. Whilst it was not possible to know Abby's exact thoughts on these occasions it is plausible to assume Abby realised she could not see through the red box, but could see through the net material. What is "known" about materials will become "better known" (Athey, 2007:51).

In Chapter 5 **Hannah's** containing and enveloping experiences afford her many opportunities to engage in mathematical thinking, gaining experience and understanding of such concepts as size, volume, capacity and quantity as discussed on page 114; these are again summarised in table 8.1.

Concept	**Actions**	**Mathematical thoughts**
Size	Placing objects in bowl. Figure	The object fits inside the bowl. The object is small in comparison to the bowl
Volume/capacity	Ladling water into bowl Figure	Full ladle of water only covers a small area of silver bowl
Quantity	Continuing to ladle water into bowl	How many more ladles of water to cover the object

Table 8.1

Possible mathematical learning

In Chapter 6 **Emily's** initial exploration of the water has been around containing, enveloping and exploring its dynamic vertical trajectory properties

Figure 8.19

Filling containers

Figure 8.20

More filling

Emily's interest appears to widen to include exploring the transporting properties of the water (page 159*)* illustrating Forman (1994)'s belief, that the physical properties of materials can influence thinking.

Figure 8.21

The sand

Supporting the idea that through following their own continuities children can develop of a higher level of understanding.

In Chapter 7 **George** demonstrates how he creates his own continuities, extending his experiences and testing his understanding of the functional dependency relationship when rolling a ball through the boundary of his legs (page197).

Figure 8.22
Rolling through

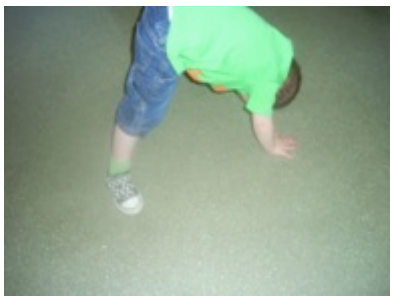

Figure 8.23
Through again

Further exploits exemplify George's developing cognitive understanding of going through a boundary, as he continues to test out his hypothesis with the log and sand pit

Figure 8.24
Filling

Figure 8.25
Catching water

Figure 8.26
Flowing out

Figure 8.27
All gone

The four children's stories presented in earlier chapters of this thesis have provided numerous examples and evidence of how these two-year-olds thinking can be supported and developed through their schematic interests.

3. Do schemas translate and transform across different boundaries within a young child's life?

All four children's stories include examples of continuity in their schematic exploits at home and nursery. There are obvious differences in the "content" selected by the children to "nourish" (Nutbrown, 2011:14) and ensure "continuity", Appendix 3 provides a correspondence of selected content and schematic match between home and nursery suggesting, that two-year-old children's schemas do translate across the boundaries of their life.

No indication was found to support the view that children's schemas transform or alter as a result of crossing boundaries home to nursery. It could be deemed that **Emily's** story (chapter 6) provides additional evidence that two-year-old children's persistent threads of thought remain at the surface as they translate across boundaries.

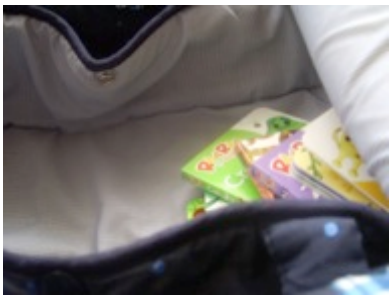

Figure 8.28
Books inside

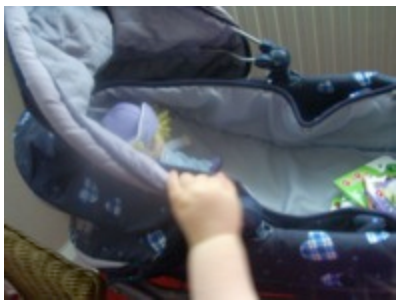

Figure 8.29
Doll inside

In her home environment regardless of the few resources available to select from**, Emily's** prevailing threads of thought are showing that, as Atherton (2013:38) proposed, the actual "objects were not of consequence". Figures 8.28

and 8.29 illustrate how Emily's continuity of thought is maintained through her use of content to match her forms of thought (Forman, 1994).

4. How do social and cultural influences influence on children's schemas?

Research on how family and home experiences mediate young children's development is discussed in chapter 2, underlining the importance of recognising that cultural influences are not a separate "aspect of a system within which" young children develop (Rogoff, 1990:28), whilst also demonstrating the importance of working with parents to share pedagogical understanding of *how* young children learn.

The main evidence, to suggest social and cultural mediating influences from the home environment on children's schemas, is presented in chapter 5 through Hannah and in Chapter 6 through Emily's number knowledge. It appears both Hannah, (2:6), and Emily, (2:2), demonstrate an enjoyment and confidence around the use of number names. Athey's (2007) explanation suggests it is the schematic interest—form of thought— that provides a meaningful context for the acquisition of number names.

Hannah's and Abby' s "discriminating and "sensitised" (Nutbrown, 2011:145) selection of content has provided a meaningful context for the acquisition of number names. Super and Harkness (2002), however, would argue that it is through the cultural influence of their individual homes—the parental ethnotheories—that have provided Abby and Hannah with such exposure.

> She [Hannah] always sits with me and Ryan [older brother], she has her own book, we count and colour, it encourages Ryan to do his work… When we are at the supermarket we count everything, the tins, the crisps, then again when we put it away. (Home visit 21st June)

Rogoff (1990:28) identifies that "biology and culture are not alternative influences but inseparable aspects of a system within which individuals develop". This thesis has illuminated the role culture plays in young children's development, recognising and illustrating the influence young children's home environments and parental practices have on their development. It has also

underlined the importance of developing collaborative relationships between parents, key persons and children.

5. To what extent does schematic behaviour contribute to young children becoming social actors in their own life?

The four children's stories provide strong evidence of their individual abilities to become social actors in their own lives. Through the intrinsic motivation of their schematic interests, all four children demonstrate their ability to hypothesise; to construct their understanding; to investigate and explore; to test and re test their theories; to develop mastery; to identify continuities in their learning; to persevere; to develop perceptual plans; to instigate their own learning; to build on previous experiences. When adults recognise, understand and support young children's schemas, they are better placed to understand and support associated learning. Allowing children the space to become social actors in their own learning.

6. What kind of environment and pedagogy can support children's schematic explorations and development?

To develop and support children's schematic explorations the study recognises the need for certain vital ingredients within the environment and pedagogy.

- Emotionally safe, and nurturing environment
- Adult role
- The physical environment

Emotionally safe and nurturing Environments

The importance and need for young children to develop close relationships and attachments with a special person has been greatly acknowledged (Page et al. 2013; Clare, 2012; Elfer et al 2012 and Gerhardt, 2004). Emily's story in chapter 6 provides a clear illustration of a close relationship and attachment with Leanne her key worker "that is affectionate and reliable" (Elfer et al 2012:23).
Emily is observed seeking out Leanne moving to become physically closer to her. Leanne provides emotional security through acknowledging and recognising

Emily's needs, being able to anticipate what will interest and motivate her. Such attuned and individual attention allows Emily to feel "special" and "cherished" (Elfer et al 2012:23) providing her with the emotional security that ensures she is ready to become involved with her exploration of the environment (page 136-141).

Adult role

Atherton, (2013), Nutbrown (2011) and Athey (2007) concur the adult role is vital in supporting young children to extend and develop their learning.
In Chapter 7 George's exploits of sharing with the nursery staff how he could cause the water to travel through the nursery gate (page 184), provides an example of the need for adults to be both considerate of children's interests and supportive. On this occasion the adult did not consider this a waste of water and so try to re direct his actions, instead each adult spent time with George watching the water, talking to him about what the water was doing, so extending his understanding and furthering his language acquisition. Nutbrown (2011:70) considers an essential part of the adult role is "extending and developing children's learning through identifying, understanding, supporting and extending their patterns of thinking."

The environment

The stories and photographs provide the reader with a visual picture of the physical environment of the nursery setting as it supports these four children's learning narratives. These accounts also demonstrate that children are not prevented from getting dirty or wet during their exploits but given the freedom to explore and identify their own interests. Adults respect and value the children's achievements recognising them as having "worthwhile and insightful understandings of the world around them" (Janzen 2008: 292).

Though not the focus of the data, it is important to recognise how hard the adults work to construct equality within the adult-child learning relationship. Such a quality, I believe, comes only through an in-depth knowledge of child

development and schema and a capacity on the part of the adult to attune themselves to the child's interests.

8.2 Contribution to knowledge

A key achievement of this thesis is the four detailed narratives, which contribute to the understanding of young children's developing patterns of cognition, thus gaining an understanding of *how* young children use their schemas actively to construct knowledge from their lived experiences. This thesis sits alongside other similar studies that have focussed on the fine detail of children's schematic learning – (Atherton, 2013; Nutbrown, 2011; Arnold, 2010; Meade and Cubey, 2008 and Athey, 2007).

It is the intension knowledge gained from this thesis will impact on the practice within the nursery setting. Through providing opportunities to share and reflect on the observations captures, in-depth knowledge and understanding of particular children's schema have developed between the key workers and myself. Over time through the process of staff meetings and internal training events the findings, the new knowledge gained from this thesis will continue to be shared amongst all staff within the nursery.

Additionally, the thesis contributes the detailed written and photographic illustrations, portraying how the day-to-day experiences of four two-year-old children contributes to the construction and co-ordination of cognitive patterns, the children's individual schemas. Involvement within the thesis of the participants parents provided opportunities to share the new knowledge, Hannah's mother provides evidence of how sharing such knowledge has all ready impacted on her practices at home:

> I wouldn't have let her do that (stack the cups) before this (involvement in research project). Now I understand better, I realise why she wants to put her truck on the TV cupboard. I find it really interesting, I have really started to watch her, I try to use my speech to support her ideas more. (Mother. 21st June home visit transcripts)

Through on going parental workshops held within the setting, it is the intension further parents will also benefit and learn about young children's schemas.

The use of photographs alongside analytical commentary to illustrate the forms of thought is a form of report that will enable the principles and underpinning schematic pedagogy to be accessed by a wide range of readers. Through a publication plan of articles and a book I hope to impact on others, however I realise such impact is not measurable, or necessarily possible to capture.

A further contribution to knowledge relates to the ethical issues of involving young children as research participants. Unlike Lahman (2008:282) who warns within research situations young children are " always othered". The methodological approaches adopted within this study depict each of the four children as "co-constructer of knowledge, identity and culture" (Janzen, 2008:291). By this, I mean that the four children are respected and valued as participants and they are viewed not as 'othered' but as "other-wise"(Nutbrown, 2010:286) children whom the researcher can respect and learn from.

8.3 Direction for further research

As a researcher, I have learnt that it can be difficult to truly represent the voice of participants. I feel the narratives provide a strong degree of 'voice' for the four participants, but in future, I would be keen to further develop a methodology, which allows greater control for the parents and key workers within the whole research process. Within this study the time restraints enforced a schedule the schedule was mine. In a future study without such time constraints parents and key workers could have more control and I believe this would give them a stronger voice.

The intention within this research was to focus on four two-year-old participants, and to follow and track their schematic journey over 16 weeks. A further study would be to follow these same children through to the end of key

stage one, to continue to observe how their threads of thinking develop, and fit within the expectations of current educational practices in maintained primary schools in England.

I would also be interested to plan a study following new practitioners who have recently been introduced to the concept of schema, identifying how the knowledge supports their practices as they build relationships with children and their families. The study would also explore how knowledge of schema influences and mediates their delivery of statutory elements of the Early Years Foundation Stage Curriculum (DfE 2012) and National Curriculum (QCA 1999).

Final thoughts

Whilst conducting the research reported in this thesis, I have learnt many new things, however the one resounding concept that stands above the rest. The deeper my pedagogical knowledge becomes the easier I find it to articulate young children's actions and forms of thinking to their parents and key workers. Thus I can reiterate Athey's (2007) belief of the importance and power that knowledge of pedagogy has for all those who are involved in young children's lives.

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Appendix 1

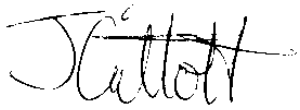
Dear Julie

Re: The stories of four young children's schematic explorations within their lived experience

Thank you for your application for ethical review for the above project. The reviewers have now considered this and have agreed that your application be approved with the following optional amendments.
(Please see below reviewers' comments)

7. Approved with the following suggested, optional amendments (i.e. it is left to the discretion of the applicant whether or not to accept the amendments and, if accepted, the ethics reviewers do not need to see the amendments):
Suggest removing supervisor name and address from second box of consent form or amend sentence to read more coherently.

Yours sincerely



Mrs Jacquie Gillott
Programme Secretary

Appendix 2

Participant Information Sheet

Doctorate in Early Childhood Education.

Thesis undertaken by Julie Brierley

Research Project Title:

The stories of four young children's schematic explorations within their lived experience

The study seeks to illustrate the capacities and competences demonstrated by young children's explorations of schematic interests.

The study aims to closely observe how schematic interests (repeated play experiences) support young children's (24-36 months) developing understanding of the world.
The study will focus on the schematic experiences (repeated play experiences) of a group of four young children considering both their home life experiences together with those gained whilst attending a full day care nursery setting.

The research aims to observe, identify, track and explain how such repeated play experiences (schematic threads) continue and translate across different boundaries in a child's life, illuminating how this impacts on young children's capacity to exercise their competences.

Invitation

I am writing to ask if you would give permission for your self and your child to take part in the above research study project. Before you decide it is important for you to understand why the research is being done and what it will involve.

Please take time to read the following information carefully and discuss it with others if you wish.
Please do not hesitate to ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the project's purpose?

I am currently studying for a Doctorate in Early Childhood Education at Sheffield University. As part of my course I have to conduct a research project.

I continue to be fascinated in how young children construct their own knowledge and understanding of the world through the use of repeating patterns of play – schema.

The study will focus on the schematic experiences of a group of four young children considering both their play experiences (schematic thinking) in their homes together with those gained whilst attending a full day care nursery setting.

The research aims to observe, identify, track and explain how such schematic thinking can be influenced through the children's lived experiences.

Why have I been chosen?

I have identified four children in the age group of 24-36 months, who attend nursery for 2-6 sessions each week, and whom demonstrate repeated play patterns (schema) during their self chosen play at nursery.

What is involved if I take part?

I am aiming to conduct a series of observations on each child over a 16 week period starting in May 2012. It is anticipated two or three observations will be collected each week. To enable schematic links to be made between nursery and home the observations will need to be gained from both the nursery setting and the home environment.

The observations will vary in length between 10-20 minutes using a combination of written, video and photographic recordings.
The observations aim to be naturalistic, carried out to capture your child engaged in different types of self chosen play.

To ensure the least disruption I appreciate the need for flexibility meaning all home observations times will be agreed at mutually convenient times for yourself and your child. The observations taking place in nursery will not intrude on the normal session routines or staffing

A copy of all observations will be shared with you, it is hoped this will also provide an informal opportunity to gain any further information about the observed play

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep (and be asked to sign a consent form). You can however still withdraw at any time without having to give a reason.

What are the possible disadvantages and risks of taking part?

I see no foreseeable disadvantages or risks in taking part. Your child's key worker will be present and the researcher is also a familiar member of staff.

What are the possible benefits of taking part?

Through the research process I hope to acknowledge, and recognise young children's competencies and contributions to the learning process, which in the future can be used to further develop nursery practice and provision.
The observation process will provide an opportunity to further discuss your child schematic play patterns and so gain a deeper understanding of their developing knowledge. All on going observations will be shared and agreed by yourself before they are included in the study
On completion of the research I can provide you with a feedback session explaining my research findings and recommendations.

What happens if the research study stops earlier than expected?

If this is the case, you will be informed and the reason(s) explained.

What if something goes wrong?

Sheffield University Research Ethics Committee have reviewed this project. If you have any complaints about the research please contact me in the first instance, or my university supervisor Cathy Nutbrown at c.e.nutbrown@sheffield.ac.uk if you are not happy with this outcome, you can contact Dr David Fletcher, Registrar and secretary, The university of Sheffield, Firth Court, Western bank, Sheffield. S10 2TN email d.e.fletcher@sheffield.ac.uk Telephone 0114 222 1100

Confidentiality

All the information collected about you child during the course of the research will be kept strictly confidential. Digital images will be stored on a pass word protected laptop, personal names will not be used; however I am seeking your permission to use photographs in the final report.
All images will be returned to you at the end of the research project

What will happen to the results of the research project?

It will be sent to the university of Sheffield for marking and may be seen by other members of the university department for verification purposes. It may also be shared with fellow students on the course. In the future there may be a possibility that the researcher seeks to publish aspects of the study in educational peer reviewed journals.
I would also like your permission to share the final findings of the research project with staff members of The Harlequin Day Nursery, so that we can consider further research to inform and develop our nursery practice and provision.

Contact for further information

Please do not hesitate to contact me if you have any further questions or you require further information. My contact details are: Julie Brierley The Harlequin Day Nursery. Telephone no 01723 501061 harlequinnursery@btconnect.com

This information sheet is for you to keep.

When you have considered this information, if you wish to take part

please could you return the consent form attached.

If you do not wish to take part please either contact me or leave a message at nursery.
If I have not heard from you in a week I will phone to confirm that you do not wish to take part so I can approach another potential participant.

Thank you for your time
Julie Brierley.

Participant Consent Form

The stories of four young children's schematic explorations within their lived experience

Name of Researcher: Julie Brierley

Please initial box

I confirm that I have read and understand the information letter dated March 2012 for the above project and have had the opportunity to ask questions. ☐

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. ☐

I understand that personal information will be anonymised before analysis and photographs can be used in the report
I give permission for members of the research team to have access to my anonymised responses. ☐

I agree to take part in the above research project ☐

_____	_____	_____
Name of Participant (*or legal representative*)	Date	Signature
_____	_____	_____
Researcher	Date	Signature

To be signed and dated in presence of the participant

Copies:
Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the information sheet and any other written information provided to the participants. A copy for the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

Appendix 3

Abby's schematic activities in nursery and at home

Schema	Nursery	Home
Containing and enveloping	Hiding objects in dough	Placing self in box
	Filling containers with water	Filling bag with cloth
	Covering objects with water	Covering legs with jigsaw pieces
Dynamic vertical	Up and down movements on the slide	Up and down movements on trampoline and swing
	Tipping water	Emptying content of toy box
	Chalk marks on floor and board	
	Painting vertical marks on board with water	

Hannah's schematic activities in nursery and at home

Schema	Nursery	Home
Dynamic back and forth	Movement of balls down guttering	
	Movement of self around outdoor area	
	Crashing wooden trucks	Playing with toy trucks
Dynamic vertical	Tipping water	Stacking cups
Containing and enveloping	Filling containers with water/sand	Containing cups in the sink
	Placing toy doll in crib	Completing jigsaw puzzles

Emily's schematic activities in nursery and at home

Schema	Nursery	Home
Dynamic back and forth	Walking back and forth across the bridge	Crawling along the floor
	Pushing pram around	Pushing pram around
	Driving toy truck around	Driving toy truck around
Transporting	Transporting water around the outdoor area	Transporting objects inside the pram
Containing and enveloping	Enveloping objects in water/bubbles	Dressing and undressing dolls
	Wooden puzzles	Jigsaw puzzles
	Containing self within the toy car	Placing object and self inside her toy pram

George's schematic activities in nursery and at home

Schema	Nursery	Home
Dynamic **vertical/horizontal**	Tipping water	Rolling cars down garage ramp
	Kicking/ rolling balls	Pushing cars long floor
Containing and enveloping	Placing containers inside other containers	Placing himself in containers
	Filling containers	Building farm fence around self
Going around a boundary	Mark making around the edge of a table	Mark making
	Mark making in flour	Building perimeter walls of a house (Lego)
	Traveling around the boundary of the outdoor area	Building perimeter farm fence
Going through a boundary	Sitting inside hula hoop	Passing toy cars under bridges
	Placing wooden hoops on his arms	
	Pouring water through log	