

# 1

## Seeing the wood for the trees: adults' roles in supporting sensory play

Sue Gascoyne

### Overview

Over the last century, Steiner, Dewey, Montessori and Malauzzi have all made the case for the numerous benefits of sensory play. With evidence that children's access to sensory play is in decline, the treasure basket can potentially offer a tool for increasing sensory stimulation, especially when the three stages of play set out in the *Sensory Play Continuum* are followed. Treasure baskets are used for simple exploration, problem solving and domestic role play (see Goldschmied and Jackson, 2004); older children use them in pretend and goal-oriented symbolic play, where the objects became something new, reflecting and portraying children's ideas and thoughts; when combined with other resources, the potential for creativity and problem solving significantly increases. Adults have a crucial, yet subtle role in maximising quality sensory play opportunities from play with a treasure basket across all three stages of the *Sensory Play Continuum*. This chapter explores whether treasure baskets can help compensate for children's limited access to multi-sensory experiences and, if so, what role adults have.



Picture a children's play area on a wet and cold day with a group of toddlers excitedly jumping in muddy puddles. Their delight is apparent but what remains a mystery is what each individual child is most enjoying or

## 16 CHILDREN'S LEARNING CULTURES

gaining from this sensory-rich experience – be it the satisfyingly noisy splash, the striking cold feel of the water gushing into their wellies, the swirly patterns as their feet stir the mud into the puddle, feeling 'at one' with nature, exploring and discovering 'cause and effect', the liberating feeling of space, time and freedom or a myriad of other unique sensations and experiences. The author observed this group for approximately 20 minutes: the puddle sustained their interest while some nearby play equipment remained conspicuously empty. The children were 'enjoying some fresh air' with enlightened childminders but what of their parents' reactions to their mud-encrusted clothes later that day? Some may have reminisced about similar experiences from their childhood, others may have reflected upon the amazing learning potential of a puddle and still others may have simply sighed at the thought of all that washing! This snapshot succinctly illustrates two key strands to this chapter: (1) the importance and appeal of sensory-rich play for children and (2) the role of adults in supporting and encouraging such experiences.

### The benefits of sensory stimulation

Ask an adult about their typical childhood play memories and chances are they might reflect upon days spent exploring, climbing trees, building dens, lighting fires and making mud pies and rose petal perfume! If you can relate to this happily, you are not alone: these were just some of the vivid childhood play memories that 146 parents and practitioners retold as part of the national Sensory Play Research project (Papatheodorou, 2010).

Those lucky enough to share such memories will probably understand why children get so much from sensory-rich play and why it is important. Watch children's concentration, focus, determination, problem solving and social skills as they play with natural materials. Not only is it hugely satisfying for children but it's often free, requiring little or no preparation. The value of sensory experiences (both inside and outdoors) and benefits for children's learning have been highlighted by a raft of respected philosophers and educationalists over more than a century (for example, Steiner, Dewey, Montessori and Malaguzzi).

We now know that the human brain is made up of billions of cells called neurons. These remain at rest until a stimulus occurs when an electrical signal passes from one neuron to another, relaying information about everything we see, hear, taste, touch and smell (Wartik and Carlson-Finnerty, 1993). When we experience a sensory input, a new 'pathway' is formed. The more times these connections are made and reinforced, the thicker this 'pathway' becomes, and the faster signals travel, helping us to think and recall more accurately and swiftly. Picture a multi-pack of plant seeds. The scene on the packet is bursting with verdant foliage, colourful flowers and a wide variety of exotic vegetables. Within the packet are several tiny envelopes, each containing a different seed variety. Like the

neurons in a baby or child's brain, each tiny seed is packed with amazing potential but unless the seeds are planted and regularly nourished with water, sunlight and nutrients from the soil, they will not grow. Even if a seedling forms, without constant nourishment this will wither and die. So, too, it is only through repeated sensory stimulation of the brain cells and through connections being made with other parts of the brain, to transform the sensory stimulation into action and ultimately feedback (MacIntyre, 2010: 87), that neurons and pathways survive the ruthless pruning that takes place in the human brain and children's talents have the opportunity to blossom and grow. Just suppose that one of the tiny envelopes of seeds is accidentally left in the packet and not planted alongside the other seeds. The seeds themselves may be perfect but they will not yield magnificent vegetables or flowers without the required conditions and nourishment. So it is with the brain: a child's eyes may be perfect in every way but if the necessary connections have not been made with the ocular part of the brain, they will be incapable of actually seeing. The importance of sensory experiences as a mechanism for establishing these vital connections could not be clearer.

From birth, children use all their senses to make meaning from the world around them. Our brains are constantly decoding patterns (in sensory information) to help us understand the world, shaping children's brains and influencing development and learning. As we will see in Chapter 2 in this volume, sensory play experiences like Forest Schools offer children the freedom to become 'discoverers' (Tomkins and Tunnicliffe, 2007: 155; see also Knight, 2009) and the opportunity to experience and experiment. Resources featuring colour, pattern, creativity, physical involvement and fun will appeal to both hemispheres of the brain, enhancing learning. Sensory stimulation is great for kinaesthetic, tactile, visual and auditory learners, so given that a good treasure basket offers all these attributes, it's not hard to imagine some of the fascination and delight they promise.

Crawley and Eacott (2006) made the links between memory recollections and early sensory experiences, particularly visual, touch and smell. A fact supported by the Sensory Play research as 68% of adults' most vivid childhood memories involved sensory-rich play outdoors (Papatheodorou, 2010). Closely related to this is the link between the development of language and sensory experiences. Crowe (1984: 39) claims that 'Words are connectors ... children's senses cry out to be used first to provide the experiences that they will later need in order to connect. Children must feel the world, listen to it, see it, taste it, smell it, "know" it. That takes time and a great deal of silent investigation in peace and privacy'. Memory is clearly an integral factor in giving meaning to words and in helping to link together the complex architecture of the brain. A young child playing with a treasure basket (see below) may discover that some things feel cold to touch but can warm up if held and only much later attach the words 'cold', 'warm' and 'metal' to the experience.

## 18 CHILDREN'S LEARNING CULTURES

Given the importance and appeal of sensory play to children and our vivid memories of these as adults, it is striking that nearly 82% of adults surveyed felt that play has changed. Their prevailing childhood memories included: *being* outdoors, *feeling* and *making* things, contrasting strongly with the finding that, nowadays, children's toys are predominantly plastic, manufactured and commercialised, with screen-based entertainment increasingly dominant (Papatheodorou, 2010). When combined with more structured, age-segregated lives and less free play outdoors, young children's exposure to multi-sensory experiences appears to be declining.

### Play with treasure baskets – a sensory-rich resource

Plentiful access to freely available natural resources is obviously paramount but sensory play isn't just about getting mucky and playing outside. The carefully selected items within a treasure basket can happily engage young babies to primary age children and children with special educational needs (SEN). Adults may struggle to see the appeal of this resource – a sturdy basket, containing about 50 objects, picked for maximum sensory appeal, including a mix of shapes, colours and objects that move in different ways and have different weights, textures and properties (see Figure 1.1). But children absorbed in play for an hour or longer suggests something special is taking place. When working in orphanages in 1940s Italy, Elinor Goldschmied observed babies' fascination for household objects – the things commonly found in a utensil drawer, and the idea of a treasure basket, for babies, was born.

#### A treasure basket will normally include:

Small cardboard box, mini board book	Teaspoon, wooden spoon
Pastry, shaving, mini bottle, nail brush	Wooden eggcup, napkin ring, pegs, juicer, coaster
Metal tin, thick length of chain, measuring spoons/bowl, coaster, whisk	Mini glass jam jar, mini flower pot
Pine cone, stone, shell, dried whole orange, wicker ball, loofah, large cork	Bean bag, knitted ball, crocheted mat, flannel

**Figure 1.1** Objects commonly found in a treasure basket

A treasure basket of 'open-ended' resources which can be played with in countless ways and literally grow with a child, clearly resonates with the *Reggio Emilia* (Rinaldi, 2006) approach. Key to its success is the careful sourcing of stimulating objects and allowing children time and space to explore these fully and freely. The adults' role in treasure basket play is to sit nearby, attentive, responsive and unobtrusive. The baby or child gets to make their own choices about which objects to explore and how, without interference or feeling encumbered by a right or wrong way of playing. Although originally conceived for babies, there is growing recognition of their value for children across the ages as well as for children and

adults with SEN. Great for developing literacy and numeracy, encouraging sorting and learning about the properties of materials – for example, hot and cold, heavy and light, big and small, floats and sinks – a treasure basket introduces surprisingly sophisticated concepts that help unlock secrets to how the world works.

The research highlighted children's particular enjoyment of exploring and investigating the different textures, smells and noises associated with a treasure basket and their great interest and focus. Tomkins and Tunnicliffe (2007: 150) note that children are most attracted to items which have a 'novel nature or appearance, have aesthetic attributes, display some responsiveness to them, engage with their previous experience, or elicit affective feeling'. Clearly, a carefully sourced treasure basket provides babies and children with sensory-rich stimulation and a deeply satisfying experience from the opportunity to explore and to discover things for themselves (Arnold, 2003). It may also compensate for children's limited access to multi-sensory experiences and even prepare them to get the most from other sensory-rich opportunities.

## The benefits of treasure baskets

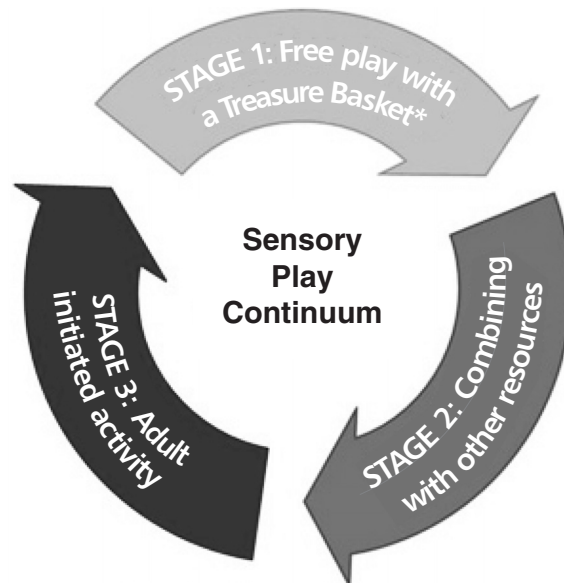
Free play with a treasure basket is believed to offer a host of benefits for children across the ages, including:

- developing fine motor skills and hand-eye coordination
- stimulating all the senses, including the lesser known proprioceptive and kinaesthetic senses, necessary for providing positional feedback
- creating vital connections in the brain
- encouraging exploration and discovery
- increasing concentration and focus
- developing shoulder, arm and back muscles
- building confidence and self-esteem
- firing imagination
- encouraging problem solving and creativity
- helping develop speech and language.

So how does a collection of ordinary objects become a basket of awe and wonder? It's the very fact that the basket doesn't include any toys, and like that muddy puddle or the proverbial cardboard box, every treasure is packed with open-ended play potential. So a knitted purse becomes a bag, a dolly's hat, a submarine or even a hot air balloon basket. These open-

## 20 CHILDREN'S LEARNING CULTURES

ended resources with no right or wrong way of being played with, encourage children to explore, problem solve, create and discover to their hearts' content. Although patterns of play can be seen, there are differences too, with babies playing for over an hour simply with one object, be it a woven maize coaster or a heavy metal chain; toddlers repeatedly transporting a metal chain between a tin and bowl; or older children preparing 'magnificent meals'.



**Figure 1.2** The Sensory Play Continuum

\*Fits with original Goldschmied concept (Goldschmied and Jackson, 2004)

## The Sensory Play Continuum

For Elinor Goldschmied, the treasure basket was perfect for babies not yet mobile, with limited scope for choosing what they play with. However, a greater potential of treasure baskets can be seen if one observes children of different ages playing side by side. For the older child, the basket of disparate objects offers intrigue, exploration and problem-solving opportunities. A baby might focus on 'What is this object like?' while an older child moves quickly to 'What can I do with it?' and 'What can it become?' This behaviour, and in particular a return to mouthing (the earliest form of problem solving), is not unusual when older children encounter unfamiliar objects. Based on observations of treasure basket play, the Sensory Play Continuum has been developed (Gascoyne, 2008).

The continuum is a fluid and transitory process, with iterative cycles of repetition and flexibility over the order in which the stages are accessed. For example, one reception class teacher introduced the treasure basket via an adult-initiated activity (i.e. Stage 3) in order to model appropriate use and respect for the resources. The children then progressed to free

play. Similarly, other practitioners have used the activity structure to enable older children or those with SEN to access the resource. Through play with peers and familiarisation with the objects, they then play with the objects freely.

The three stages of the Continuum (see Figure 1.3) are a tool for increasing sensory-rich play opportunities and helping adults to stay detached. The stages are indicative of how children play with a treasure basket and are not prescriptive. Central to the Continuum is the hypothesis that a child's play may vary not just because of their age and developmental needs but also in terms of how the treasure basket is presented, i.e. the stage of the Continuum. Unlike other forms of heuristic play characterised by lots of similar objects, a treasure basket presents richly diverse objects in close proximity, providing multiple challenges and problem-solving opportunities. Similarly, the use of the objects in an unexpected way, for example with another resource such as sand, water or magnets in Stage 2 or as part of an adult-initiated activity in Stage 3, helps to 're-frame' the resources.



**Figure 1.3** The three stages of the Sensory Play Continuum

The following three observations illustrate how a child (R, aged 2 years and 1 month) played with a treasure basket at each of the three stages of the Continuum. Attention is drawn to the changing role of the adult throughout.

## Stage 1 – Free Play with a Treasure Basket

### Context

The treasure basket was positioned in the book corner where R particularly liked to sit.

### Practitioner observation

R picked up objects one at a time, looked at them, waved them and placed them next to him. He chatted to himself whilst doing this. The words were mainly unrecognisable, but occasionally they were recognisable words such as 'ball'. All his chatter was very animated with a range of intonation.

He then moved on to playing with objects together. He picked up the pan, put the metal whisk in the pan and then tried other metal objects together. He tried to put the wooden whisk into the pan – this didn't fit so he went back to emptying and investigating objects randomly one at a time.

Two other children joined. R left the treasure basket then quickly returned and continued emptying objects one at a time. He then started reading the mini book to himself. When he finished reading the book, he said 'bye bye book' and continued emptying objects one at a time from the basket, each time chatting to himself as if explaining what he had got or was doing.

Another child joined – no interaction between children. R continued investigating objects and placing them next to him. R returned to the book, put it back in the treasure basket when he had finished reading it, then put the other objects back in the basket, chatting as if he was naming the objects as he did it. R left the activity and went to play in the home corner.

### Learning points and adults' roles

This session is characterised by a good range of vocabulary, verbalising, concentration and focus. Examples of domestic role play and pretend play were evident as was problem solving, as R discovered that some objects didn't fit and tried other objects instead. The photos suggest that R 'sorted' the objects into different piles but his commentary gave no indication of their meaning or relevance. R appears to be commentating on his play, for his own ends – private speech (Vygotsky, 1986) – rather than engaging in conversation. The practitioner's knowledge of R and his preference for playing with books, influenced where and how the treasure basket was offered.



## Stage 2 – Combining with Sand

### Context

The session was observed by an experienced nursery practitioner who placed a treasure basket containing most of the objects next to the sand tray. There were no other resources in the sand, however these were in containers next to the sand where children could have freely accessed them as usual.

Child C (aged 2 years and 8 months) very rarely plays in the sand tray, preferring the mark-making area and small world where he generally plays without any commentary or communication with others, however he has good vocabulary and willingly talks to adults when they initiate conversation or asks for approval from adults.

### Practitioner observation

9:45 Two children came to the sand tray.

R chose the pan, metal egg cup and wooden spoon: he tried filling both the pan and egg cup with sand using the wooden spoon. R put the peg into the pan, then picked up the tin and attempted to place it on top of the objects in the pan. He played in silence, not attempting to communicate with me, other children or make any utterances during his play. The other children were talking during play. R then got the whisk, saying 'mix, mix' several times.

9:50 Child C joined the other two in the sand tray. He attempted to fill the metal egg cup several times before choosing the jar to fill.

R got the jar, attempted to put the whisk inside, abandoned the whisk when it did not fit, then tried the tin lid before finding the jar lid and successfully put it on top of the jar. He then got the pan and brush, saying 'mixing'.

9:55 R left the sand tray and went to play with the construction toys. Child C then spent a further 50 minutes playing with the resources in a range of ways:

- filling the metal containers with sand and using the brush to carefully brush the sand
- play changed to pretend play and he started to comment on his own play. He filled the metal egg cup with sand, saying 'wait a minute need egg'. Then filling the pan with sand: 'making tea now'. He went on to fill the tin with sand and showed me, saying: 'Sand inside of it, see'
- using the pastry brush to brush the sand off the sides of the sand tray

*(Continued)*

## 24 CHILDREN'S LEARNING CULTURES

*(Continued)*

and off his hands, repeating 'brush, brush, brush', then singing 'brush, brush, brush it off, it clean now, it not got any sand on it anymore'

- burying objects in the sand, saying 'where's it gone?', then finding it and saying, 'here it is'.

The session eventually drew to an end as the rest of the room was tidied up.

### Learning points and adults' roles

The almost absence of language contrasts markedly with the previous session where R commented throughout his play. The addition of sand may account for his play in silence (possibly a sign of deep concentration). In fact, this stage was typically found to be the most creative stage of play. Interestingly, C's play was also noteworthy as he played in a focused way for 70 minutes, never needing an adult to sustain his play. This is all the more remarkable given his age and the fact that he was playing with sand, a medium with which he rarely chooses to play. Several of his actions – for example, filling the tin with a spoon, smoothing the top, using the brush in the sand – bear striking similarities with those of other children observed playing with a treasure basket and sand. Both R's and C's play were experimental, involving much trial and error as they explored what objects would fit or work for the task they seemingly had set. This is typical of other sessions observed both at Stage 1 and 2 of the Continuum, where the child appears to have set themselves a challenge, be it tossing a chain in a pot or fitting an object inside another, and perseveres with this without frustration. This type of explorative play was also described by Goldschmied and Jackson (2004: 120–1) when reflecting upon heuristic play.

Both R's and C's play evolves into pretend play, perhaps showing Hughes' stages of play (2006) in accelerated fashion. C creates his own song mirroring his actions and then appears to invent his own game of hiding the objects. Another observation of 4-year-olds revealed more games. The three children filled a mini flower pot with sand and, on discovering that the sand had disappeared (through the seldom noticed hole), developed a game of 'who can run the furthest around the garden before the sand disappears'. Although apparently playing independently, Child C communicates what he is doing to both the practitioner and other children. In fact, the practitioner remarked upon how C was very vocal, commenting on his own play.

## Stage 3 – Adult-initiated Activity

### Context

The *Huff Puff Houses* activity was selected with R in mind although other children initially joined in. All the children joined in with the huff, puff and blow your house down and enjoyed blowing during the story.

### Practitioner observation

R started helping sort the objects (to make the three houses) but quickly went back to the story poster and started retelling the story in his own words, pointing to all the pigs, naming them and showing me that the wolf had fallen down. He repeated 'bang' and clapped at the picture of the wooden house falling down.

He then started playing with the treasure basket toys as he had done in previous observations, getting the pan and whisk, saying 'mix, mix'. His play with the treasure basket toys changed compared to previous observations he seemed to link his play with the story. He placed the felt toy on top of the loofah, saying 'night, night', and pointed to the picture of the wolf lying on the floor at the end of the story.

He then found the mini book in the basket, started reading it and naming objects in the pictures. He then handed it to me to read to him. He returned to the story poster pointing to pictures and retelling the story to himself before leaving the area.

## Learning points and adults' roles

The practitioner picked an activity about a book to build upon R's special interest. The relevance of this is borne out by the recurring theme and subsequent social sharing of the book. Crucially, the practitioner responded flexibly when R changed the focus. Although the activity itself did not sustain R's interest, it does appear to act as a catalyst for enjoying and re-enacting the story on another level. R's focus shifts from the story to domestic role play, back to the story (this time using the objects), to the mini book, before finally retelling the story. Although R's focus appears to flit, the treasure basket/Huff Puff activity remain common threads throughout. R revealed great confidence and mastery in remembering and retelling the story, and again was very vocal. Examples of domestic role play, pretend play and highly creative 'compositional play' (Papatheodorou, 2010: 27) were evident as R linked the objects to the story and used a felt 'gingerbread person' to represent the wolf and a piece of loofah for a bed.

## 26 CHILDREN'S LEARNING CULTURES

### Emerging themes

Several key themes emerged from the research, many of which are supported by observations generally:

#### Simple to complex play

Play becomes increasingly complex with children's age/developmental level and familiarity with the resource. Children are frequently seen moving from single-object play to more complex play with multiple objects (Garvey, 1977). However, even sessions featuring problem solving and pretend play involved very few objects. In an hour-long session, a 3-year-old used just a few simple objects. Similarly, three 4-year-olds generated exceptional problem solving, peer mentoring, creativity and scientific exploration through play with sand and just two objects. There is also evidence that the Continuum functions in 'multiple cycles of actions' whereby the experience from Stage 3 is internalised to lead to free play (Stage 1) and play with a combination of other materials and resources (Stage 2). This was especially true when other children were involved where there was 'evidence of peer (subtle and unconscious) facilitation' (Papatheodorou, 2010: 34). For example, in one pre-school observation (not part of the research), a treasure basket was offered to a girl with separation anxiety to occupy and distract her when her mother left. Not only did the treasure basket totally and happily absorb her for about an hour but, after being joined by a group of peers using the objects for pretend play, her play changed significantly from single-item exploration to using multiple objects for domestic role play.

#### Concentration and focus

In several of the sessions, play was 'moved on' by practitioners and not allowed to take its natural course. Where this did evolve, extended focus and concentration were evident. In one session, an 8-month-old playing with the treasure basket and sand 'ignored other children crawling through the sand tray and continued spooning'. She continued, 'attempt[ing] to spoon around another child sat in the sand tray and then [finally] moved away'. Although this session was truncated, this child, like so many others observed, displayed amazing levels of focus and concentration.

#### Language and communication

The effect of treasure basket play on language is an area worth further investigation. An 8-month-old babbled excitedly when playing with the basket in Stage 1; was quiet in Stage 2; and was described as laughing and chortling in Stage 3. Similarly, R babbled incessantly in Stage 1, with some

decipherable words; was largely silent in Stage 2; and verbalised continuously in Stage 3. Compare this with C, normally quiet during play, who commentated and communicated eloquently at Stage 2 and some interesting language responses are evident.

## Imagination, creativity and problem solving

Problem solving emerged as a key theme throughout many of the 77 observations – from mouthing of objects; experiments with gravity, trial and error, cause and effect; discovering different properties (such as the need to add water to sand) and the effects of change. In all cases, children were deeply absorbed in their endeavours. On its own, a treasure basket was used for exploration, problem solving and domestic role play. Older children used the objects in pretend and goal-oriented symbolic play, where they were used to produce something new, reflecting and portraying children's ideas and thoughts. In some instances, 'compositional play' was evident where 'the synthesis and composition of resources portrayed something new that went beyond the original qualities and attributes of the resources' (Papatheodorou, 2010: 27). Simple, open-ended resources like treasure baskets are powerful agents for firing children's imagination and creativity. The fact that there are no right or wrong ways of playing appears a huge contributory factor.

### Summary

By observing children playing, we gain a valuable insight into their interests, developmental levels, schemas and personalities – essentially what children enjoy doing and how. Children's propensity for imagination, problem solving, creativity and social skills are apparent from the exploration and play themes that emerge. Although we cannot yet quantify the value-added of children's play with a treasure basket, observations appear to support this. Perhaps of greater interest is not what children learn (most appear hard-wired to get what they need from sensory-rich play) but rather what we as adults can learn from them. Just like those childminders who made it possible for that muddy puddle to be fully and freely enjoyed, adults play a vital, albeit subtle role in supporting (or, conversely, limiting) sensory-rich play. In reflecting upon a fun winter walk through a wood, three children aged 4–10 years relayed how they'd enjoyed exploring, looking, listening, discovering, finding out, creating, imagining and challenging themselves: 'All the things that we do every day'. And what of adults' roles in this? Giving children the opportunity, space and time to engage in a wide range of experiences and, crucially, watching, listening and learning through children's eyes.



### Questions for discussion

1. How best can you offer a play environment conducive to quality play, in terms of space, time, opportunities and mindset?
2. How can you select resources and activities which have meaning for children?
3. How can you support children's learning when you're not actively involved in the play?
4. How can you promote quality play with curriculum outcomes, rather than being curriculum driven?

### References and suggested further reading

Entries in bold are further reading.

- Arnold, C. (2003) *Observing Harry*. Buckingham: Open University Press.
- Crawley, R.A. and Eacott, M.J. (2006) Memories of Early Childhood: Qualities of the Experience of Recollection. *Memory and Cognition*, 3(2): 287–94.
- Crowe, B. (1984) *Play is a Feeling*. London: Allen and Unwin.
- Garvey, C. (1977) *Play: The Developing Child*. Glasgow: Fontana/Open Books.
- Gascoyne, S. (2008) *The Continuum of Sensory Play* (self-published).
- Goldschmied, E. and Jackson, S. (2004) *People under Three: Young Children in Day Care*. London: Routledge.**
- Hughes, A. (2006) *Developing Play for the Under 3s: The Treasure Basket and Heuristic Play*. London: David Fulton.**
- Knight, S. (2009) *Forest Schools and Outdoor Learning in the Early Years*. London: Sage.
- MacIntyre, C. (2010) *Play for Children with Special Needs: Supporting Children with Learning Differences, 3–9* (2nd edn). London: Routledge.**
- Papatheodorou, T. (2010) *Sensory Play*. Report submitted to Play to Z. Chelmsford: Anglia Ruskin University.
- Rinaldi, C. (2006) *In Dialogue with Reggio Emilia: Listening, Researching and Learning*. London and New York: Routledge.**
- Tomkins, S. and Tunnicliffe, S.D. (2007) Nature Tables: Stimulating Children's Interest in Natural Objects. *Journal of Biological Education*, 41(4): 150–5.
- Vygotsky, L.S. (1986) *Thought and Language* (translated by A. Kozulin). Cambridge, MA: MIT Press.
- Wartik, N. and Carlson-Finnerty, L. (1993) *Memory and Learning*. New York: Chelsea House Publishers.