Characteristics of Effective Early Learning

HELPING YOUNG CHILDREN BECOME LEARNERS FOR LIFE

Edited by Helen **Moylett**

2   The importance of self-regulation for learning from birth

David Whitebread

Introduction

Within developmental psychology, it is now well established that by far the most significant determinant of children's success as learners is their development of what are termed 'metacognitive skills' (i.e. their awareness, knowledge and control of their own mental processes) and positive emotional and motivational dispositions towards themselves as learners. These elements combined have come to be referred to as the development of 'self-regulation'. While these abilities were once thought to be late developing, emerging in children only towards the end of their primary schooling, a wealth of recent research has shown that they emerge and can be seen to develop from a much younger age. Indeed, as we shall see, early indications of abilities which underpin self-regulation have now been detected in children when they are only a few months old. As I want to argue in this chapter, there is therefore now good evidence to suggest that it is self-regulatory abilities which lie at the core of children's development as effective, powerful learners, from birth.

What also makes this research particularly exciting for those of us involved in early childhood education is the further evidence that self-regulation skills are very heavily influenced by young children's early experience. In other words, early years educators are in a unique position to have a major beneficial influence on children's development, their realization of their full potential as learners and a whole range of positive life outcomes.

In this chapter I therefore want to review some of this important research, including some of my own, illustrating the precise components of self-regulation, the early emergence of these skills and dispositions in very young children and the implications for a pedagogy for self-regulation in early childhood education. The chapter is therefore organized into four sections, dealing with the following topics:

- the nature and characteristics of self-regulation;
- the early emergence of self-regulation in young children, including cognitive, emotional, social and motivational elements;

- the importance of developing self-regulation for children's success as learners and for their emotional well-being;
- environmental and social interaction factors which support children in developing self-regulation and implications for practice in early childhood education settings.

The nature and characteristics of self-regulation

Three theoretical and research traditions have contributed to the development of our understandings concerning the nature of self-regulation abilities and dispositions. These arise from the cognitive psychology tradition, originally inspired by the Swiss developmentalist Jean Piaget, which has developed the notion of 'metacognition', the sociocultural tradition, within which the theoretical ideas of the Russian Lev Vygotsky have been pre-eminent, and the social cognitive theories of motivation, inspired by the ideas and research of the influential American Albert Bandura.

Perhaps the simplest way to convey what is meant by 'self-regulation', and the contribution of each of these traditions to this phenomenon, is to ask you to undertake a short task. Carry out the following subtraction sums in your head (i.e. without writing anything down), but then write down what you did in your head to work out the answer:

A) 58 – 23
B) 72 – 37
C) 104 – 97

The first thing to note is that, as an adult, you were able to select a way (or 'strategy') for doing these subtractions. In other words, you have *knowledge*, in your long-term memory, of how to do this type of sum, and this is something you could not do when you were a very young child, but have learnt or developed over the years.

Second, you probably have more than one strategy for doing subtractions, and you may have used more than one of these in undertaking these three sums. For example, many people would do sum A by taking 3 from 8 (the units) and then 2 from 5 (the tens). However, in sum B, because 7 is greater than 2, many people change their strategy, so they might, for example, count on from 37 to 40, then from 40 to 70, and then from 70 to 72, and add up the three amounts to get the answer. In sum C, again, as the numbers are close together, and as they fall either side of 100, many people will just count on in ones from 97 to 104, or visualize the two numbers on a number line with 100 in the middle, and see that they need to add 3 (because 97 is 3 below 100) to 4 (because 104 is 4 above 100).

There are, of course, many others strategies you could have used which would work perfectly well, and which you have devised and developed over the years. In other words, as an adult, you have a repertoire of strategies, and you are able to select which one to use, for any particular task, based on your knowledge of such tasks, what works for you, and so on; i.e. you exercise *control* over your own mental processing.

And finally, not only can you do these subtractions in your head, but, simultaneously, you are able to *monitor* what you are doing and can report it afterwards. In other words, you are aware of your own mental processes. In addition to allowing you to articulate what you have done, this monitoring process is vitally important, as it allows you to keep track of where you are in the task, to detect errors, to be aware of how easy or difficult you are finding the task, and so on. In turn, the information derived from monitoring can then be used to exercise various control functions including correcting errors, going back to an earlier stage of the task, changing or modifying strategies and increasing concentration.

The dominant model used to represent the interactions of metacognitive knowledge, control and monitoring is that developed by Nelson and Narens (1990). Here these internal mental processes are represented as a feedback loop between two spheres of activity, which occur simultaneously within the brain, which they refer to as the META level (in which metacognitive knowledge of relevant strategies is stored and referred to) and the OBJECT level (in which the actual task, in this case the subtraction sum, is undertaken). The Monitoring function consists of information about where you are up to in the task, how well it is going, and so on, flowing from the OBJECT level to the META level; and the Control function consists of instructions from the META level to the OBJECT level either to continue with the procedures as planned, or to change strategy in some way if a difficulty or an error has been detected (see Figure 2.1).
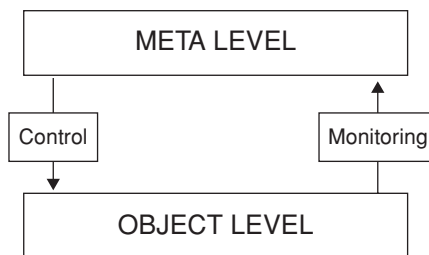
Figure 2.1 Nelson and Narens' model of metacognition.

Describe a language-related task that involves object level and meta level. Describe what might happen in the meta level during the task.

According to the theoretical models of the self-regulated learner developed within the three research traditions mentioned above, you have learnt how to

become an able learner, thinker and social being in the world because you have developed the 'metacognitive' knowledge, monitoring and control you used when doing the subtraction sums, and apply these whenever you undertake any kind of mental task, solve any type of problem, exercise your creativity, manage and negotiate a social situation, or manage and control your own emotions and motivations. The 'metacognitive' research has been concerned with exploring the internal mental processes involved in these achievements; the sociocultural, Vygotskian research has explored the social and educational processes which support the learning and development of these abilities; and the motivational research has explored the processes which provide the mental energy or effort to undertake this learning.

Within the cognitivist tradition, the term 'metacognition' was originally coined by Flavell (1979) to describe a phenomenon he observed in a series of investigations concerning the development of children's memory abilities, and the strategies they used to help them remember (Flavell et al. 1966). In these experiments, he presented children in the age range 5–10 years with a set of objects, and then pointed to some of the objects in a set order. After a delay of 20 seconds or so, during which he observed the behaviour of the children, he then asked the children to indicate the objects he had pointed to, and in the correct order. Not surprisingly, the older children were more likely to be observed using an appropriate strategy (in this case, 'verbal rehearsal', involving saying or whispering the names of the objects to themselves) and were much more successful than the younger children at the memory task.
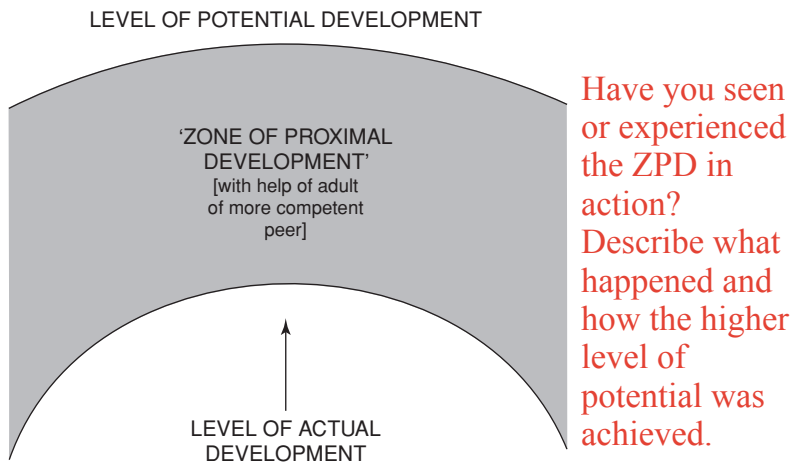
The gradual emergence of a wide range of such cognitive strategies, related to many different areas of learning, had been documented in children by this time, and it was generally considered that strategies were adopted by children when they became able to use them. However, Flavell realized that it might not be that simple. It could be that the younger, 5-year-old children were capable of using the verbal rehearsal strategy, but were just not aware of it. So, he taught it to them and showed that they were capable of verbally rehearsing and, when they did so, they performed as well on the memory task as the 10-year-old children. However, when given a similar task a few days later, many of the 5-year-olds failed to use verbal rehearsal and again failed the task. Flavell termed this a 'production' deficit, i.e. the children could use verbal rehearsal but failed to produce it spontaneously in relation to an appropriate task.

Early years practitioners will recognize this phenomenon. Young children can often do something one day but, when it is presented to them subsequently in a slightly different form, the connection is not made with the earlier experience and they are not able to apply what they have learnt to the new situation. In these landmark studies, Flavell demonstrated that this behaviour is not a consequence of children's inabilities to use particular strategies before a certain age. The children in his studies did not lack the basic cognitive resources to verbally rehearse. Rather, he argued, their difficulties should be conceptualized as a 'metacognitve' problem. In relation to Nelson and Narens' model, represented in Figure 2.1, the limits on what

the children could do were located in the monitoring and control processes, and at the META level, rather than at the simply cognitive OBJECT level.

This early work, and subsequent research establishing the fundamental significance of metacognitive abilities for learning, has led to an explosion of research concerned with the development of metacognition in children, teenagers, students and adults of all ages. This has included, in recent years, some initial studies in the development of metacognitive abilities in young and very young children, to which we will return in the next section.

Paralleling this work concerned with the internal mental processes of metacognition, has been a body of research inspired by the theoretical work of Vygotsky (1978, 1986) concerned with the social processes through which children learn, and learn to self-regulate. The fundamental idea here is that, at any point in time, and in relation to any area of understanding or skill, the developing child has two levels of capability. The first, developmentally lower level consists of what the child is currently able to do on their own. The second, higher level, is what they are able to do with some help or guidance from an adult or more experienced peer. The ideas, understanding and skills or abilities which need to be mastered to move from the lower to higher level are referred to by Vygotsky as the 'zone of proximal development' (see Figure 2.2).

LEVEL OF POTENTIAL DEVELOPMENT

'ZONE OF PROXIMAL
DEVELOPMENT'
[with help of adult
of more competent
peer]

Have you seen or experienced the ZPD in action? Describe what happened and how the higher level of potential was achieved.

LEVEL OF ACTUAL
DEVELOPMENT

Figure 2.2 Vygotsky's 'zone of proximal development'.

Think, for example, of a young child attempting a jigsaw which is slightly too difficult for them. On their own they will fail and give up. However, an adult working with them can model useful ways of proceeding (e.g. collecting and joining up the edge pieces, looking at the picture and then looking for pieces that match

items seen in it), can make suggestions and give prompts (can you find the corner pieces? Shall we find all the blue bits for the sky?), can ask strategic, 'metacognitive' questions which direct the child to think through the task (would it help to sort the pieces in some way? Which part of the jigsaw should we start with? Does some of it look easier and some harder?) and so on.

This type of supportive interaction, referred to in the research literature as 'scaffolding', has been shown to be consistently beneficial to children's learning. One key element here, however, has been shown to be the sensitivity with which the adult hands over the regulatory role to the child, as the child gradually acquires the skills and understandings they need to be able to do the task on their own. The contingency with which the adult withdraws, just doing enough at all times to enable the child to proceed with the task, and consequently supporting the child's autonomous action in relation to the task, has been consistently shown to be crucial in this regard (Wood et al. 1976). Where this is done skilfully, the child is supported in making the transition from being 'other-regulated' to being 'self-regulated' in relation to that area of learning. This area of research, which demonstrates and explores one of the key elements in the processes by which children can be supported to develop their self-regulation abilities, has led to significant findings in relation to supportive styles of interaction, and the role of language in the development of self-regulation. These are issues to which we will return in the final section of this chapter.

The final element which has recently been increasingly integrated in models of self-regulation relates to theory and research concerned with motivation. It has been increasingly recognized that the exercise of metacognitive skills and self-regulation requires mental effort. Work in this area was originally inspired by Bandura's (1997) theory and research related to the notion of self-efficacy, which refers to the human need to feel competent, the positive feelings which we experience when we achieve something new, and the consequences for our approach to new tasks when we have an underlying belief in our own competence to tackle new challenges. A further significant contribution in this area is that made by Dweck's work concerned with what is termed 'attribution' theory (Dweck and Master 2008). This concerns to what we attribute our successes and failures. Put simply, she has demonstrated that some individuals attribute their successes and failures on tasks to factors outside their control, such as fixed ability, luck and so on. Failure on a task, resulting in this type of attribution, leads to a range of negative consequences, including avoiding such tasks in future, quickly giving up when any difficulty is encountered, and so on. In contrast, other individuals attribute their level of performance to the amount of effort they put into a task or activity. For these people, failure on a task leads to renewed effort, increased concentration and perseverance. A considerable body of research has now shown the very strong links between self-efficacy, attributional beliefs and other related aspects of motivation to children's developing self-regulation.

Theory and research which was initially quite separate from these cognitively focused motivational theories, but is now increasingly recognized as a crucial

element in motivational aspects of self-regulation, concerns children's developing abilities to regulate their emotions. Research in this area, for example, has built on early work showing that securely attached children are more playful, more positively curious about new objects and experiences, more able to cope with change and happy to take risks and make mistakes. Extensive research on the relationships between attachment and emotional self-regulation has been reviewed by Calkins and Leerkes (2011). In other related work with preschool children, Eisenberg et al. (2011) have reviewed work related to the relations between effortful control (an early element of self-regulation, as we will review in the following section) and the development of emotion regulation and well-being. In a review of five qualitative studies with older students, Pekrun et al. (2002) found that positive emotions were consistently related to effort, interest, use of elaboration strategies and self-regulation and negatively related to irrelevant thinking. Negative emotions showed the opposite pattern, being negatively related to interest, effort, elaboration strategies and self-regulation and positively related to irrelevant thinking and external regulation.

The gradual integration of theories and research related to emotional development, motivation and cognitive aspects of self-regulation has recently been accomplished through the development of a new and widely accepted, overarching model of human motivation, originally developed by Deci and Ryan (2008) which is termed 'self-determination theory'. This proposes three basic human needs for feelings of autonomy, competence and relatedness. The first two needs clearly relate to feelings of control and self-efficacy, and relatedness (a feeling of being valued and loved by significant others) clearly relates to the work on attachment and emotion. Within this model, the majority of the latest research has focused on the notion of autonomy, or the child's sense of 'agency', 'empowerment' or control. Reeve et al. (2008) have provided a recent review of the extensive work showing the strong links between feelings of autonomy and self-regulation development. This clearly relates to the early work of Wood et al. (1976) and much more recent work (see the final section of this chapter), concerned with autonomy promoting practices in interactions between adults and children. There are highly significant insights emerging from this work which provide strong guidance for early childhood educators keen to promote children's self-regulation. In summary, the established view of self-regulation which is currently widely adopted within the research community is that expressed by two of the leading members of this research community. The modern, integrated view of self-regulation is that it consists of 'The process whereby students activate and sustain cognitions, behaviours, and *affects*, which are systematically oriented toward attainment of their goals' (Schunk and Zimmerman 1994: 309, original emphasis).

This leads me onto one final point concerning what is meant by self-regulation and, particularly, what is not meant. In some of the literature, and certainly in some commentaries written upon it for the educational profession, there is an unfortunate confusion between self-regulation and compliance. Within Schunk and Zimmerman's definition, however, it is important to notice that we are talking

about children's ability to organize themselves mentally in relation to the achievement of *their* goals. Of course, many young children will share or happily adopt their teacher's goals as their own. However, some will not, for various reasons which are beyond the remit of this chapter. Being self-regulated, however, is not the same as being compliant or conventionally a well-behaved, 'good' pupil. This is a vitally important point as children who are non-compliant, but have well-developed self-regulation abilities, and children who are compliant, but who are disposed to be dependent on adults, and have not developed good self-regulation abilities, are both done a disservice through this confusion.

The early emergence of self-regulation in young children

Extensive recent research has established that if children are observed undertaking tasks which are age appropriate and meaningful to them, the early building blocks of metacognitive and self-regulatory abilities can be discerned in very young children. At the turn of the new millennium, Bronson (2000) provided a comprehensive review of research up to that date on self-regulation in children from birth to the end of the primary school phase, covering cognitive, emotional, motivational and social areas of development and, in a recent paper, a colleague and I have reviewed progress in this research since that date (Whitebread and Basilio 2012). Table 2.1 provides a summary of the key findings available at that time of Bronson's review in relation to early cognitive self-regulation.

Table 2.1 Early development of cognitive self-regulation

From 0 to 12 months old	Focuses attention on specific others, objects and own activities (reaching, grasping, manipulating objects)
	Notices regularities and novelties in the social and physical environment
	Begins to participate and predict sequences
	Begins to initiate behaviour sequences with people and objects
	Notices effects of own actions
From 12 to 36 months old	Wants predictable routines and resists change
	Can choose among a limited number of alternatives
	Goal directed behaviour
	Begins to notice and correct errors in goal directed activities
	Uses an increasing number of strategies to reach goals
	Shows cognitive organization by matching, sorting and classifying
From 3 to 6 years old	Can engage in a wider range of cognitive activities
	More able to carry out multi-step activities
	More able to control attention and resist distraction
	Can learn to use more advanced problem solving strategies
	More able to choose tasks appropriate for own level of skill

Source: Adapted from Bronson (2000).

There are many videos on YouTube showing experiments about development with children. Use any search terms from this reading (example: Piaget child experiment) to find a video. Describe the experiment.

In the subsequent decade or so, this work has been considerably developed and now focuses predominantly of three areas of early cognitive control, or 'executive functioning', which have been established as fundamental ways in which the human brain operates and learns. In an influential more recent review, Garon et al. (2008) identified these as working memory (the ability to hold information in mind while operating on it); inhibitory or effortful control (the ability to stop an initial, prepotent, automatic or perceptually driven response and replace it with a response related to an internal goal or thought); and cognitive or attentional flexibility and focus (the ability to control attention, to focus on key elements of a task, and to switch attention when required). Early evidence of each of these abilities has been reported during the first year of life, when they are strongly dependent, of course, on environmental factors such as novelty. From the second year onwards, however, progress has been documented in each of these abilities as children become able to handle more information for longer periods of time, and their attention and behaviour are increasingly under control and independent of context.

Hofmann et al. (2012) have produced one of a number of recent papers demonstrating ways in which these early executive functions form the building blocks for the beginnings of cognitive self-regulation. A range of studies have now demonstrated, for example, very early examples of children's emerging abilities, at 10 months, to use something learnt in one context and apply it to another (analogical learning); to request help appropriately, at 14 months, based on recognition of the limits of their own abilities; and to recognize and correct errors (at 18 months) in manipulative play.

In a paper reporting a study carried out in the early 1970s, concerned with 3–6-year-old children's memory abilities in meaningful tasks, a Russian psychologist, Z.M. Istomina (1975), included a number of transcripts of the children's performance which illustrate beautifully the early emergence of cognitive self-regulation. The task required the child to remember a list of five food items which were needed for a pretend lunch party (set out in one corner of a large room) so that she could ask the shopkeeper (at a pretend shop in the far corner of the room) for the correct items. Here is Istomina's record of the performance of a 5-year-old girl called Alochka on this task:

> Alochka (five years, two months) was busily engaged in preparing lunch, and several times reminded the experimenter that she needed salt.
>
> When it was her turn to go to the store, she asked, with a busy expression on her face:
>
> "Z. M., what should I buy? Salt?"
>
> The experimenter explained to her that this was not all and named four more items that were needed. Alochka listened attentively, nodding her head. She took the basket, the permission slip and money and went off, but soon came back.

"Z. M., I have to buy salt, milk, and what else ?" she asked. "I forgot."

The experimenter repeated the items. This time Alochka repeated each word after the experimenter in a whisper and, after saying confidently, "Now I know what I had forgotten," went off.

In the store, she went up to the manager and, with a serious expression, correctly named four items, with slight pauses between each.

"There is something else, but I forgot" she said.

(Istomina 1975: 25–6)

We can clearly see here evidence of emerging metacognitive awareness and cognitive self-regulation in Alochka. Throughout she is aware of what she has remembered and what she has forgotten. To begin with she tries the simple strategy of 'nodding her head' for each item on the list, but quickly realizes this hasn't worked. So, the second time, she uses a different strategy, 'repeat(ing) each word after the experimenter in a whisper', and this is much more successful. Aloshka is clearly an able 5-year-old, but already, at this very young age, she is showing some important elements in the process of developing into a very successful self-regulated learner.

Similar advances have taken place in our understandings about the achievements of young children in the emotional, social and motivational (affective) domains, and these are similarly reported in detail in my previous paper (Whitebread and Basilio 2012). Once again, this later review builds on the work of Bronson (2000). Table 2.2 provides a summary of the key findings available at the time of Bronson's review in relation to early affective self-regulation.

In the last decade research in this area has focused on the development of two key phenomena. First, we now have good evidence that young children develop what is commonly referred to as a 'theory of mind', or an understanding that other individuals have a mind like their own, and their own perspectives, at a much younger age than was previously thought. This understanding is of vital importance to the developing child's emotional well-being, forming the basis for effective social interaction and sensitivity, empathy, the development of friendships and positive relationships with adults. Following Piaget's early work suggesting young children are 'egocentric' (i.e. not able to take on the perspectives of others), and early research using language-based laboratory tasks, children were not thought to develop these understandings until around 5 years of age. However, recent work focusing on where younger children look rather than what they say, and using non-verbal tasks, has demonstrated that children as young as 15 months appeal to mental states, such as beliefs, to explain the behaviour of others. In imitation tasks, children of a similar age have also been shown to imitate precisely the actions of a machine or robot, but to do what a human model appeared to intend to do (e.g. place a toy on the edge of a table), rather than what they actually did (e.g. apparently accidentally drop the toy on the floor) (Meltzoff 2011).

Table 2.2 Early development of social-emotional regulation

From 0 to 12 months old	Regulation of arousal and sleep/wake cycles
	Responsive interaction with others
	Attempts to influence others
	Begins to anticipate and participate in simple routines
	Responsiveness to emotional expressions of others
From 12 to 36 months old	Increasing voluntary control and voluntary self-regulation
	Growing ability to comply with external requests and awareness of situational demands
	Increasing assertiveness and desire for independent action
	Increasing awareness of others and the feeling of others (empathy)
	Some spontaneous helping, sharing and comforting behaviours
	Increasing awareness of social rules and sanctions
	Increasing ability to inhibit prohibited activities and delay upon request
From 3 to 6 years old	More capable of controlling emotions, abiding by rules, and refraining from forbidden behaviours
	More capable of using language to regulate own behaviour and influence others
	More interest in peers and peer acceptance, so more apt to regulate self in relation to peers
	Can learn more effective interaction strategies
	Can engage in dramatic play with roles and rules
	Begins to talk about mental states of self and others
	Better understanding how others may feel
	Can engage deliberate helping, sharing, and comforting behaviours
	Internalizing standards of behaviour
	Developing more stable prosocial (or antisocial) attitudes and behaviours

Source: Adapted from Bronson (2000) and Kopp (1982).

The second main focus of research in the area of affective self-regulation has concerned children's developing inhibitory and effortful control abilities. This work has used 'Do's and Don'ts' and 'Go/NoGo' tasks (where the child has to perform an action, or not, depending on a rule) and delay of gratification tasks, such as the famous marshmallow task, where the child has to resist touching or eating an attractive toy or sweet. As in all areas of self-regulation development, considerable progress has been found in children within the first few years of life in their performance on these tasks. Significant individual differences have also been found, however, but a number of studies have shown that early secure attachments are strongly associated with these affective self-regulation abilities. We will return to the issue of environmental and social factors which seem to support the early development of children's self-regulation in the final section.

Once children enter educational institutions, of course, the demands on their cognitive and affective self-regulatory abilities are considerable. There is strong evidence, as we shall see in the next section, that well-developed self-regulatory abilities help children to make a smooth transition into pre-school and early schooling.

At the same time, however, the more challenging opportunities that a high quality early childhood educational setting can offer can also significantly enhance all young children's early self-regulatory abilities. This will be the topic of the final section of this chapter.

In my own research, within the Cambridgeshire Independent Learning (C.Ind.Le) project (Whitebread et al. 2005, 2007, 2009), I have particularly explored the development of 3–5-year-olds' self-regulatory abilities. In this study we worked with 32 nursery and reception class teachers, and the children in their classes (just under 1500 children altogether) and we video-recorded around 700 self-regulatory 'events' in these settings. One outcome of this study was the production of an observational instrument, the Checklist of Independent Learning Development (CHILD 3–5), which includes 22 statements, in the areas of cognitive, emotional, prosocial and motivational self-regulation (see details in Whitebread 2009). These statements were selected from a longer list, derived from their research literature, of children's self-regulatory achievements in this age range, and indicate the abilities which distinguish high from low, or well from poorly, self-regulated children at this stage of their development. This instrument has subsequently been translated into a number of languages, and has been extensively used in research and by practising early childhood educators, both within the UK and internationally. As well as providing a valuable and teacher-friendly assessment tool related to individual children's development, it has also been effectively used as a basis for discussions about children's development with parents, and as an audit of practice supporting self-regulation development within classes and settings.

The importance of developing self-regulation

I have devoted a good part of this chapter to describing the nature of metacognition and self-regulation, and their development in young children, because it is vitally important that early childhood educators have a deep understanding in this area. This arises from two now widely accepted findings from a considerable body of research. First, that metacognitive and self-regulatory abilities are the single most powerful determinants of children's academic success and a range of positive life outcomes; and, second, that these abilities are significantly affected by environmental and social interaction factors in children's early experience. Early childhood educators are, as a consequence, in a position to make a very positive difference to children's developmental outcomes. This section addresses the findings regarding the significance of developments in this area, and what we can do about it is addressed in the final section.

There are essentially three types of evidence that have convinced the research community, and early childhood policy decision makers, internationally, about the importance of this area. First, there have been a number of longitudinal studies looking at the short-term and long-term outcomes of different types of pre-school

and early childhood education provision. (see Chapter 1). The HighScope research and evaluation established that seven dollars of Federal funding was saved for each dollar spent on the project. As a consequence, not surprisingly it had a dramatic impact on governments internationally and education policy makers. It also led to renewed research to attempt to identify which features of such a high quality early education programme contributed to these outcomes. In the UK the more recent Effective Provision of Pre-School Education (EPPE) project (Sylva et al. 2004), for example, was set up to address this question and has provided important complementary evidence.

What emerges as significant about effective early educational environments are features which crucially support young children's developing self-regulation. These environments offer real intellectual challenge with emotional support, and put the child very much in control of their own learning. In the HighScope regime, for example, the central model of learning is the 'plan, do and review' cycle. Each child plans their activities for the session or the day in a small group with an adult educator, often referred to as a 'key worker'. The children then move off to carry out their planned activities, and later return to review progress again with their small group, again supported by their key worker.

This pattern of working also builds in purposeful adult-child and child-child conversations, which oblige and offer children the opportunity to reflect upon and talk about their learning. Sylva et al. (2004) particularly identified, within the highest quality settings, the occurrence of episodes of 'sustained shared thinking' between adults and children, where adults supported children's ideas and helped the children to extend and develop them. As we shall see, providing opportunities for children to talk authentically about their learning is an important component in helping them to develop as self-regulating learners. This is also not just a matter of cognitive activity, but has important emotional and motivational elements. What all the high quality early years regimes identified by Sylva and Wiltshire (1993) did was to help children develop what they term a 'mastery' orientation to learning and to themselves (see Chapter 4). Children in high quality early years environments developed secure feelings of self-efficacy. Such children grew to believe that, through effort, they could solve problems, understand new ideas, develop skills and so on. They felt in control of their environments and confident in their abilities.

The second, very considerable body of evidence consists of studies that have looked at the role of metacognitive and self-regulation abilities in a wide range of cognitive and affective areas of development. In cognitive areas such as maths, reading, writing, thinking skills and problem-solving, and in affective areas such as social relationships, tolerance, cooperation, impulsiveness, addiction and eating disorders, self-regulation skills are of vital significance. Some studies have looked specifically at the immediate short term outcomes of children's individual differences in this area. Essentially, these studies are often focused on the consequences for young children's transition into their early years of pre-school and schooling. So, for example, in the area of cognitive self-regulation, Blair and Razza (2007) found

How could you apply "plan, do, review" in language teaching?

that, out of a range of possible factors, including a measure of their general intelligence, the level of inhibitory control shown by 3–5-year-olds from low-income families most clearly predicted their reading and maths abilities a year later. In relation to affective areas, Denham and Burton (2003) showed that emotion regulation in preschool children predicted their peer status, friendship, academic competence, self-image and emotional well-being.

Finally, there have been a number of meta-analyses conducted of studies devoted to establishing the effectiveness of all kinds of educational interventions. Hattie (2009) is pre-eminent in this area, having reported the results of 800 such meta-analyses related to a huge range of educational interventions conducted all over the world. His conclusion from this vast analysis is that a range of approaches which teach children metacognitive strategies, or which support children's metacognitive awareness by encouraging them to talk about their learning, such as reciprocal teaching or peer tutoring, are among the most effective in relation to academic outcomes. Within the UK, Higgins et al. (2011) carried out a similar exercise, but just looking at around 50 meta-analyses within the UK, particularly focusing on interventions directed towards children from disadvantaged backgounds who would qualify for the Pupil Premium. The conclusions were very similar to Hattie's (2009). The most successful interventions focused on supporting children to monitor their own learning or to work collaboratively with peers in ways which required them to articulate what they understood or had learnt.

Supporting children's self-regulation in early childhood education

I have written elsewhere setting out some of the basic characteristics of early childhood education settings which appear to most effectively support young children's developing self-regulation (see Whitebread and Coltman, 2011; Whitebread, 2012). The main four elements I have stressed involve establishing an emotionally warm, secure and encouraging classroom climate, providing tasks which are appropriately challenging, giving children a real sense of control or autonomy in relation to their activities and their learning, and making the processes of learning 'visible' by encouraging children to talk about their learning. I hope at least some of the underlying rationale for each of these points has emerged from the foregoing review of aspects of the research in this area.

In this final section I want to review some of the key pieces of research which support these general conclusions, and hopefully to deepen and extend them a little by reference to some of the very interesting specific findings which have emerged. Two bodies of research have made particular contributions in this regard: research looking at classroom practices which support self-regulation, and studies of interactions with much younger children with their parents (usually their mothers). Research in classrooms has examined the characteristics of effective interventions

and the consequences of naturally occurring differences between teaching practices. This research has mostly been undertaken with slightly older primary classes, but there are key features of effective practice which emerge that can equally well be applied to working within early childhood settings. These relate to the emotional and motivational context of the classroom and the significance of social processes in self-regulation development.

As regards the first point, Perry (1998), for example, observed 2nd and 3rd grade classrooms' literacy activities over a period of six months. Based on her observations she concluded that classrooms supporting self-regulation were characterized by challenging and open-ended writing activities, opportunities for children to control the level of challenge and opportunities for them to engage in self-assessment, autonomy support (through being taught strategies to undertake certain types of task), encouragement of positive feelings towards challenge, an emphasis on personal progress and seeing mistakes as opportunities for learning.

Most of the work on social processes in classrooms has focused on the production of 'metacognitive talk' by teachers and on pedagogical practices which support children's talk about their learning. Typically, effective self-regulation interventions have involved the teacher making metacognitive and learning strategies explicit and encouraging children to reflect upon and talk about their learning. The value of the first of these arises from the established finding, first identified experimentally by Flavell in the early studies we reviewed in the first section of this chapter, that young children often fail to produce an appropriate strategy in relation to a task, even though they have previously shown themselves to be capable of performing it. Subsequent research demonstrated one reason why this might occur. Fabricius and Hagen (1984), for example, explored the use of an organizational strategy with 6- and 7-year-olds. Following improved performance some of the children attributed this to the use of the strategy, but others thought they had recalled more because they had looked longer, used their brains more, or slowed down. While only 32 per cent of the children in the latter group transferred the use of the strategy to a second recall task, 99 per cent of those who explicitly recognized the impact of the organizational strategy they had been taught did so. In other words, it is clear that, in the early stages of self-regulation development, we need to do some of the metacognitive work for the children. For example, when introducing a new way of doing something, which helps the children perform at a higher level, we need to explicitly discuss why this worked. And when introducing a new task, we need to explicitly remind the children of when they faced something similar before, and what worked then.

Ornstein et al. (2010) have supported this view in a study in which they monitored the amount of 'metacognitive talk' among 1st grade teachers in mathematics lessons. Such talk included teachers making suggestions of memory strategies the children could use, asking metacognitive questions aimed at eliciting strategy knowledge from the children, such as 'how could you help yourself to remember this?', and so on. A natural variation in this kind of 'memory relevant' talk was recorded among the teachers, ranging from 0–12 per cent of their talk during the

(Highlight 1) How could these ideas be applied in language teaching?
(Highlight 2) Describe a task, lesson or language point in which we could do this.

lessons. Also recorded was the co-occurrence of memory talk and memory demands, i.e. the percentage of times that the metacognitive talk occurred when the children were required to remember something. A highly statistically significant difference was reported between children in classes with high and low occurrences of this kind of metacognitive talk, particularly where it was related to memory demands. Most impressively, they found that children's improved strategy use and ability to remember relevant mathematical facts related to these differences at the end of the 1st grade, and were still present at statistically significant levels three years later, at the end of the 4th grade.

A wide range of self-regulation interventions have essentially developed types of activity which are likely to encourage children to talk about and reflect upon their learning. These include cooperative groupwork (where children work in pairs or small groups to undertake a task, or produce something together), peer-tutoring (where one child is asked to teach something they know or can do to another child), 'self-explanations' (where children are asked to explain their reasoning, or that of another – for example, in Philosophy for Children or general discussions), self-assessment (where children select work they are proud of to put in their portfolio, or say what they are pleased about in something they have done), and debriefing (where an activity is reviewed, perhaps supported by photographs).

In the C.Ind.Le study, reported earlier, a key finding was the frequent occurrence of children in the 3–5 age range demonstrating metacognitive and self-regulatory abilities during playful activities, particularly in constructional and pretence play (Whitebread et al. 2007). The self-regulatory activities and talk during construction play tends to relate to cognitive problem solving. In this context we often observe what is referred to as 'private speech', where children commentate to themselves on their activities. This seems to be a kind of bridge between the speech they experience in situations of adult scaffolding and their use of inner speech, or thought, in order to guide and regulate their activity. Berk et al. (2006), among others, have provided rich examples of children demonstrating and practising self-regulatory abilities during pretence play. In a recent study of complex social pretend play, a colleague and I reviewed the now extensive evidence of the numerous self-regulatory opportunities within this kind of play, as children guide the play narrative forward either in character ('Oh dear, the baby's crying!') or by stepping momentarily out of character ('OK, you pretend you're the baby and you're crying because you're upset') (Whitebread and O'Sullivan, 2012). This is perhaps the most sophisticated type of play in which young children engage, and one that many children struggle to perform well. As such, it is a prime example of where a skilful adult can participate, taking on some of the regulatory role, and, if they are able to sensitively withdraw as the children become more competent, it can be an excellent vehicle to support a range of linguistic and self-regulation abilities.

I want to finish by reviewing evidence concerning children's language development and self-regulation. In a way, we might characterize these as the two twin pillars on which children's development as learners is founded. A number of studies

What is a language learning strategy that you could train your students to use?

have shown that they are intimately related in early childhood. An American study of 120 toddlers in New England, for example, showed strong relationships between vocabulary size at 14, 24 and 36 months and a range of observed self-regulatory behaviours (e.g. the ability to maintain attention on tasks; the ability to adapt to changes in tasks and procedures) (Vallotton and Ayoub 2011).

Many of the studies contributing to this area of research have investigated early interactions between children and their mothers, often in the context of what have been termed 'joint attention episodes', where mother and child are jointly focused on a particular object or event, and communicate pre-verbally, or non-verbally, or talk about it together. In a recent article, Brinck and Liljenfors (2013) have reported evidence that metacognitive and self-regulatory abilities can be identified between 2 and 4 months of age in episodes of dyadic interaction between mothers and their infants. In such episodes, they argue, the adult is both a model for the child and a source of feedback guiding their early attempts at cognitive control. We know from a range of research that the amount of time children spend in episodes of joint attention is directly related to their language development and, thus, to their self-regulation development also. Schaffer (2004: 299) gives a very clear example of such an episode and its key features:

> Take the following common scenario of a mother and her 2-year-old child playing with a set of toys: the child inspects the toys, selects one of them picks it up and begins to play with it; the mother thereupon starts talking about that toy; she may name it, point out its uses and features, comment on the child's previous encounters with it or similar toys, and in this way verbally enlarges on the specific topic that the child is attending to at that moment. * good tip here for classroom language!

In addition to differences in the time young children spend in such episodes with their parents, there are also, however, significant differences in the sensitivity, or responsiveness, of parents or caregivers to their children, and this also impacts upon language development. Some adults are much more aware of the child's pointing gestures or gaze as indicators of their focus of attention. Furthermore, while many adults behave as described by Schaffer, following and responding to the focus of the attention of the child, others tend to attempt to switch the child's attention to their own focus of interest. Not surprisingly, the former 'attention-following' strategy, building on the child's current interest and attention, has been found to support language development much more effectively than the 'attention-shifting' approach, with consequent outcomes also for the child's self-regulation development.

Other research has also investigated the style and content of mother's speech during joint activities with their young children. Bibok et al. (2009), for example, have reviewed a range of evidence concerning the relative frequencies of 'directive' and 'elaborative' utterances in mother's talk in joint attention episodes. Directive utterances are those which directly request a specific action or behaviour, while elaborative

utterances provide contextual information of the type listed above by Schaffer, or give reasons for actions, or in other ways encourage the child to think beyond the immediate context of the task at hand. The more frequent use by mothers of elaborative styles of speech has been found to be related to young children's executive function development which, as we discussed earlier, is a key building block in the early emergence of self-regulation.

Conclusion

It is still early days in our investigations of the fascinating and complex processes of metacognition and self-regulation, their very early emergence in young children, right from birth, and their exciting and rapid development throughout early childhood. As I hope I have shown in this chapter, however, while we have much to discover, the research so far in this area has revealed illuminating and important insights into the early cognitive and affective aspects of self-regulation development and some of the environmental factors which impact upon it. Its importance in determining developmental outcomes for young children, both in the short and long terms, cannot be overestimated. At the same time, it is clear that the quality of the environments and experiences we provide for young children within early childhood educational contexts can have a profound effect on these developments. In particular, we need to pay attention to the emotional climate of our settings, so that the young children in our care feel secure and valued, to the extent to which we support children's feelings of autonomy and competence, and to the quality of the talk we provide when we interact with them in playful and conversational episodes.

Children are born into the world full of curiosity, eager to make sense of their experiences, to interact with and learn from their parents and other carers, to set themselves challenges and to achieve their goals. We can be of enormous help to them in this endeavour and it is my contention that the research reviewed in this chapter is beginning to make a significant contribution to helping us to understand how we should go about this. The ultimate goal of any teacher, of course, should be that their students grow into capable, independent learners who no longer need their help and guidance. If you leave the room, and come back a few minutes later, and all of the children are still fully engaged in their activities and have not realized you have been away, then you are probably getting it mostly right. Good luck with the endeavour.

References

Bandura, A. (1997) *Self-efficacy: The Exercise of Control*. New York: W.H. Freeman.
Berk, L.E., Mann, T.D. and Ogan, A.T. (2006) Make-believe play: wellspring for development of self-regulation, in D.G. Singer, R.M. Golinkoff and K. Hirsh-Pasek

(eds) *Play = Learning: How Play Motivates and Enhances Children's Cognitive and Social-Emotional Growth*. Oxford: Oxford University Press.

Bibok, M.B., Carpendale, J.I.M. and Muller, U. (2009) Parental scaffolding and the development of executive function, in C. Lewis and J.I.M. Carpendale (eds) Social Interaction and the Development of Executive Function, *New Directions for Child and Adolescent Development,* 123: 17–34.

Blair, C. and Razza, R.P. (2007) Relating effortful control, executive function, and false belief understanding to emerging math and literacy abilities in kindergarten, *Child Development*, 78: 647–63.

Brinck, I. and Liljenfors, R. (2013) The developmental origin of metacognition, *Infant and Child Development*, 22: 85–101.

Bronson, M. (2000) *Self-regulation in Early Childhood.* New York: Guilford Press.

Calkins, S.D. and Leerkes, E.M. (2011) Early attachment processes and the development of emotional self-regulation, in K.D. Vohs and R.F. Baumeister (eds) *Handbook of Self-regulation: Research, Theory and Applications*, 2nd edn. New York: Guilford Press.

Deci, E.L. and Ryan, R.M. (2008) Self-determination theory: a macrotheory of human motivation, development and health, *Canadian Psychology*, 49(3): 182–5.

Denham, S.A. and Burton, R. (2003) *Social and Emotional Prevention and Intervention Programming for Pre-schoolers*. New York: Plenum.

Dweck, C.S. and Master, A. (2008) Self-theories motivate self-regulated learning, in D.H. Schunk and B.J. Zimmerman (eds) *Motivation and Self-regulated Learning*. Mahwah, NJ: Lawrence Erlbaum.

Eisenberg, N., Smith, C.L. and Spinrad, T.L. (2011) Effortful control: relations with emotion regulation, adjustment and socialization in childhood, in R.F. Baumeister and K.D. Vohs (eds) *Handbook of Self-regulation: Research, Theory and Applications*, 2nd edn. New York: Guilford Press.

Fabricius, W.V. and Hagen, J.W. (1984) Use of causal attributions about recall performance to assess metamemory and predict strategic memory behaviour in young children, *Developmental Psychology*, 20: 975–87.

Flavell, J.H. (1979) Metacognition and cognitive monitoring: a new area of cognitive developmental inquiry, *American Psychologist*, 34: 906–11.

Flavell, J.H., Beach, D.R. and Chinsky, J.M. (1966) Spontaneous verbal rehearsal in as memory task as a function of age, *Child Development*, 37: 283–99.

Garon, N., Bryson, S.E. and Smith, I.M. (2008) Executive function in preschoolers: a review using an integrative framework, *Psychological Bulletin*, 134(1): 31–60.

Hattie, J. (2009) *Visible Learning: A Synthesis of 800 Meta-analyses Relating to Achievement*. London: Routledge.

Higgins, S., Kokotsaki, D. and Coe, R (2011) *Pupil Premium Toolkit: Summary for Schools.* London: Sutton Trust. http://www.suttontrust.com/education-endowment-foundation/toolkit/ (accessed 26 April 2013).

Hofmann, W., Schmeichel, B.J. and Baddeley, A.D. (2012) Executive functions and self-regulation, *Trends in Cognitive Sciences*, 16(3): 174–80.

Istomina, Z.M. (1975) The development of voluntary memory in preschool-age children, *Soviet Psychology*, 13: 5–64.

Meltzoff, A.N. (2011) Social cognition and the origins of imitation, empathy, and theory of mind, in U. Goswami (ed.) *The Wiley-Blackwell Handbook of Childhood Cognitive Development*, 2nd edn. Malden, MA: Wiley-Blackwell.

Nelson, T.O and Narens, L. (1990) Metamemory: a theoretical framework and new findings, in G. Bower (ed.) *The Psychology of Learning and Motivation: Advances in Research and Theory,* Vol. 26. New York: Academic Press.

Ornstein, P.A., Grammer, J.K. and Coffman, J.L. (2010) Teachers' 'Mnemonic Style' and the development of skilled memory, in H.S. Waters and W. Schneider (eds) *Metacognition, Strategy Use and Instruction*. New York: Guilford Press.

Pekrun, R., Goetz, T., Titz, W. and Perry, R. (2002) Academic emotions in students' self-regulated learning and achievement: a program of qualitative and quantitative research, *Educational Psychologist*, 37: 91–105.

Perry, N. (1998) Young children's self-regulated learning and contexts that support it, *Journal of Educational Psychology*, 90(4): 715–29.

Reeve, J., Ryan, R., Deci, E.L. and Jang, H. (2008) Understanding and promoting autonomous self-regulation: a self-determination theory perspective, in D.H. Schunk and B.J. Zimmerman (eds) *Motivation and Self-regulated Learning*. Mahwah, NJ: Lawrence Erlbaum.

Schaffer, H.R. (2004) *Introducing Child Psychology*. Oxford: Blackwell.

Schunk, D.H. and Zimmerman, B.J. (eds) (1994) *Self-regulation of Learning and Performance: Issues and Educational Applications*. Hillsdale, NJ: Lawrence Erlbaum.

Sylva, K. and Wiltshire, J. (1993) The impact of early learning on children's later development: a review prepared for the RSA inquiry 'Start Right', *European Early Childhood Education Research Journal*, 1: 17–40.

Sylva, K., Melhuish, E.C., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2004) *The Effective Provision of Pre-School Education (EPPE) Project: Technical Paper 12 – The Final Report: Effective Pre-School Education*. London: DfES/Institute of Education, University of London.

Vallotton, C. and Ayoub, C. (2011) Use your words: the role of language in the development of toddlers' self-regulation, *Early Childhood Research Quarterly*, 26: 169–81.

Vygotsky, L.S. (1978) *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.

Vygotsky, L.S. (1986) *Thought and Language*. Cambridge, MA: MIT Press.

Whitebread, D. (2012) *Developmental Psychology and Early Childhood Education*. London: Sage.

Whitebread, D. and Basilio, M. (2012) The emergence and early development of self-regulation in young children, *Profesorado: Journal of Curriculum and Teacher Education, Monograph issue: Learn to learn. Teaching and evaluation of self-regulated learning*, 16(1): 15–34.

Whitebread, D. and Coltman, P. (2011) Developing young children as self-regulated learners, in J. Moyles, J. Georgeson and J. Payler (eds) *Beginning Teaching, Beginning Learning: In Early Years and Primary Education*. Maidenhead: Open University Press.

Whitebread, D. and O'Sullivan, L. (2012) Preschool children's social pretend play: supporting the development of metacommunication, metacognition and self-regulation, *International Journal of Play*, 1(2): 197–213.

Whitebread, D., Anderson, H., Coltman, P. et al. (2005) Developing independent learning in the early years, *Education 3–13*, 33: 40–50.

Whitebread, D., Bingham, S., Grau, V., Pino Pasternak, D. and Sangster, C. (2007) Development of metacognition and self-regulated learning in young children: the role of collaborative and peer-assisted learning, *Journal of Cognitive Education and Psychology*, 6: 433–55.

Whitebread, D., Coltman, P., Pino Pasternak, D. et al. (2009) The development of two observational tools for assessing metacognition and self-regulated learning in young children, *Metacognition and Learning*, 4(1): 63–85.

Wood, D., Bruner, J. and Ross, G. (1976) The role of tutoring in problem-solving, *Journal of Child Psychology and Psychiatry*, 17: 89–100.