Habit Formation and Learning in Young Children

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Introduction

Helping people to manage their money better is at the heart of the Money Advice Service business plan for 2013/14. To be able to do this we need to have a deep understanding of habits that can impact on financial capability later in life. This report aims to provide insight and ideas about how to prepare the next generation to manage their money. It will also form part of a wider research programme, into all aspects of financial capability.

In this review, the term 'habit' is widened from the commonplace definition meaning an oft-repeated action or an established practice or custom requiring little thought (such as brushing one's hair or adding sugar to one's coffee) to mean unconscious mental propensities or processes, revealed as behavioural tendencies and dispositions as the child engages with the events and challenges of everyday life. Such 'habits of mind' theoretically also require little or no effort on the part of the child to initiate or sustain them and would include inclinations to take responsible risks, persistence, manage impulsivity and think 'outside the box' when in problem-solving situations. In their book The Habits of Mind (2008), psychologists Costa and Kallik describe how such habits of mind may be cultivated in children (or 'habits of thought', as John Dewey originally referred to them). They show how children can be taught, at home and at school, how to 'habituate' effective problem-solving strategies and techniques into their mental repertoire so that they develop the propensity for skilful problem-solving in a variety of life settings.

Within the first section of this report, we explain how various cognitive and metacognitive processes emerge within the young child before the age of seven years, enabling them to learn about the world and their specific environment, and to develop as learners.

We then go on to examine how, within these early years of life, growing self-awareness in the child leads to self-regulation, the ability to take increased control of their own mental processing, including

Basic cognitive processes include:

- **Imitation** - children learning through their observations; and

- **Induction** - children detecting patterns in their experiences and constructing their conceptual knowledge of the world.

their thinking, remembering and problem-solving. These processes are relevant and fundamental to the whole range of the child's development, including their emotional and social abilities and behaviours.

In the second section we investigate the key 'influences' in children's habit-of-mind formation and how they have an effect, as revealed through the child's externalised behaviours. Then, in the final section, we discuss the evidence that these mental processes and dispositions can be taught and practised, so that they become habitual ways of working towards thoughtful, purposeful, self-regulated action in facing the challenges of life.

Section 1: How do young children learn and develop?

In contemporary developmental psychology, children's learning is seen as being limited only by their lack of experience and accumulated knowledge. Increasingly sophisticated technologies for observation have been developed, enabling the systematic gathering of psychological data relating to young children's behaviours and actions, and enabling complex analysis of their patterns and tendencies. New environments may pose challenges in that a young child's lack of experience may make it difficult for them to see the relevance and priorities of a situation and to work out the best way to proceed. When these are made clear by the context and through the guidance of significant others (eg: parents, carers, teachers, older siblings) however, children's potential for learning is extraordinary. What develops through the early years of learning is the child's knowledge base, their metacognition (i.e. their awareness of and ability to control their own cognitive activity) and their abilities to self-regulate, as described in the following sections. The development of language is central to the whole process as a symbolic and abstract system.

The acquisition of knowledge

Developmental cognitive neuroscience experiments have established that many fundamental processes which underpin thinking, reasoning and learning are present and fully functioning at birth or become available within the first 4-5 years of life (Goswami, 2008). During this period, the brain increases in size fourfold largely as a consequence of a rapid increase in the number of synaptic connections between neurons in the cerebral cortex. Whilst there is no doubt that there are genetic and physiological differences between brains, the evidence suggests that each child's development and learning are highly dependent upon the type of physical and social environment in which they live, since these synaptic connections arise from and are selectively adapted by the child's specific experiences.

As the child interacts within their environment in their daily lives, they observe dynamic interactions between people and objects and their brains attempt to make meaning of it all. They do this by constructing a series of cause-and-effect explanations about the structure and functions of the things they perceive, attempting either to assimilate or accommodate the new experiences into their existing 'categorical framework' or making new categories in their search for further features that make category members similar or different. An intrinsic and active desire to understand their environment, to be in active control of their own experiences and to make relationships with other children and adults leads to an amassing of knowledge about the causes and effects of what is perceived around them. Thus, young children's fundamental assumptions about the structure of their world and about the underlying nature of its categories crucially depend on their experiences.

Imitation

Young children are proficient at learning through imitation from a very early age. Since the late 1970s, Meltzoff and colleagues have been investigating evidence of infants imitating both facial and manual gestures, highlighting the complex physical and neural activity involved in even simple imitation. There is now evidence to suggest that this is achieved by the 'mirror neuron' system (Rizzolatti and Craighero, 2004); the same neurons fire both when an individual observes another person performing a particular action as when they perform the action themselves. This system seems to underpin imitative behaviours and is also important in explaining how we understand others' minds and intentions, and how we empathise with others' emotional states. Furthermore, humans are able not only to imitate current observed behaviours, but also to defer reproducing the behaviour until a later point in time since we are able to mentally represent objects and events in our memory. This ability again appears to be present from an early age, and to develop rapidly in very young children (eg. Meltzoff, 1988). As a consequence, as we review in a later section, modelling of behaviours by adults is a powerful means of supporting learning in children.

Statistical or inductive learning

A second learning process which is in place from birth is statistical or inductive learning, namely the process by which patterns and regularities in the stream of experience are identified. Inductive learning underpins the ways in which the human visual and auditory systems develop (Kirkham, Siemmer and Johnson, 2002) and so clearly forms the foundation of a very large part of human learning. It accounts for how young children learn language with such ease and speed, how they form concepts and detect categories from their experience and how they seem so ready and able to understand causal relationships between events. Once a child has actively constructed patterns from their experience through these inductive reasoning processes, they start to apply the patterns identified and learnt in the first context

to make sense of a new experience or new information related to a separate context. This capacity to transfer learning or 'generalise' from one situation to another, explains how children adapt to new situations, and start to tackle new challenges and problems (e.g. Chen & Siegler, 2000).

> **The general propensity for inductive learning also explains why learning from experience, particularly for young children, is always more powerful than learning through instruction**.

These processes of inductive learning are active as the child proceeds through early childhood, relying upon appropriately motivating and stimulating social interactions as the child starts to acquire speech. In trying to make sense of everyday events, the young child hears adults using words to label objects, events and actions. Knowledge of words is important for the child's cognitive development because they constitute symbols; a word represents an object or an action, but it is not the object or the event itself. This facility for symbolic representation allows objects or events which are not currently perceived to be imagined in the child's mind. This facilitates reflection upon the past and planning for the future. Ways to help make the future tangible for children are discussed in a later section.

Controlling cognitive processes

The development of mental propensities and processes and their associated behaviours during early childhood involves not only constructing a bank of knowledge, but becoming able to use that knowledge appropriately to solve problems, to reason and plan. The faculties required to control the use and application of knowledge are called executive functions within the psychology literature. It is the development of the following basic executive functions which influence children's abilities to apply their knowledge in

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various situations, to control their cognitive, emotional and motivational processes, and to learn intentionally.

The most important executive functions include (Miyake, Friedman, Emerson, Witzki and Howerter, 2000):

- Inhibition - being able to restrain one's instinctive reactions
- Attentional flexibility in applying ideas or rules
- Working memory, the ability to hold information in mind while processing it.

Each of these functions is vital to the processes whereby children develop the metacognitive and self-regulatory abilities which enable them to become effective learners.

Within the last decade, there has been much developmental research into young children's executive functioning and how these basic processes enable flexible learning (Kochanska, Barry, Jiminez, Hollatz and Woodard, 2008; Zelazo Muller, Frye and Marcovitch, 2003). Inhibitory control is defined as the increasingly habituated capacity to plan, to purposefully control impulses and to suppress inappropriate behaviours (Rothbart, Ahadi and Hardy, 1994). One task used to measure inhibitory control in young children requires them to delay gratification of a desire, by suppressing a 'prepotent' (pre-existing and ready) response. The child is required to choose between a small reward now and a larger reward for later. Cross-sectional studies have found age differences in the number of children who choose to delay for a larger reward from 3 to 5 years (Lemmon and Moore, 2001; Lemmon and Moore, 2007). Not only do 4 year-olds choose the delayed, larger option more often, but their choices also reflect a consideration of size differences between the immediate and delayed options (Lemmon and Moore, 2007).

Several complex attentional flexibility tasks have been developed in which the child is asked to initially follow a rule (eg: press the button when you see a red shape) and then switch to a new or opposite rule (eg: press the button when you see a triangle). Virtually every study that has looked at this and similar tasks has found age differences from 3 to 5 years in children's ability to switch to the new rule (Carlson, 2005; Carlson and Moses, 2001; Carlson, Moses and Breton, 2002; Carlson, Moses, and Claxton, 2004; Cole and Mitchell, 2000; Dowsett and Livesey, 2000; Jones Rothbart and Posner, 2003). Carlson's (2005) data indicate that this ability develops quickly at 3 years of age: Whereas only 51% of young 3s pass this task, the number jumps to 76% for older 3s (Carlson, 2005), suggesting a sudden increase in the ability to coordinate inhibition and activation during this age period. More difficult versions of initiating–suppressing tasks includes 'games' like Simon Says (Murray and Kochanska, 2002), which are challenging even for 4 and 5 year-olds. Such tasks are made difficult by increasing the prepotency of the dominant response. For example, Simon Says involves inhibiting an action that the experimenter both tells the child to do and demonstrates. Children also show a large improvement on this task at 3 years, with 24% of young 3s, 42% of older 3s, and 67% of young 4s passing the task (Carlson, 2005).

Working memory is the brain system for short-term retention of both visual and speech information enabling the recall of past events and planning for the future. It comprises a limited space in the brain which can hold information on a temporary basis while it is processed for use in other cognitive tasks, such as reasoning, comprehension and learning (eg. Gathercole, Pickering, Ambridge and Wearing, 2004). It is termed working memory as information is not merely stored, but is actively processed and

restructured in relation to existing knowledge. It is these processes which enable the powerful inductive learning from experience which we see in young children. The ability to hold a representation of information in mind over a time delay develops before 6 months of age (Pelphrey and Reznick, 2002). Capacity continues to increase beyond the preschool years (Luciana, 2003; Rasmussen and Bisanz, 2005). More complex working memory abilities include the updating or manipulating of these information representations, which develop in the second year and throughout the preschool period (Alloway, Gathercole, Willis and Adams, 2004; Gathercole, 1998). During the preschool period, children gradually become able to hold more items in mind, and for longer periods of time (Pelphrey and Reznick, 2002); the evidence suggests improvement in the storage of both auditory information and visual–spatial information (Bull, Espy, Senn, 2004; Espy and Bull, 2005; Ewing-Cobbs, Prasad, Landry and Kramer, 2004; Gathercole, 1998; Kemps, Rammelaere and Desmet, 2000; Luciana, 2003).

Studies which assess the correlation between language and executive functions in preschoolers have generally found positive correlations between measures of executive function and verbal ability in preschool children (Razza, 2007; Carlson et al., 2004; Muller, Zelazo, and Imrisek, 2005). Particularly striking are the high correlations between verbal ability and tasks assessing attentional flexibility, the ability to switch from one pattern of behaviour or method of working to another (Hongwanishkul, Happaney, Lee, and Zelazo, 2005; Muller et al., 2005; Perner, Lang, and Kloo, 2002).

Metacognition

Learning to learn is not a single phenomenon or skill, but a group of practices that enhance an individual's capacities to learn. In his work on learning about learning, Watkins (2001) suggests that learning to learn consists of several different entities, namely:

- Making learning an object of attention
- Making learning an object of conversation
- Making learning an object of reflection
- Making learning an object of learning.

Above all these entities, at the core of learning to learn, is metacognition. Individuals think, but they also think about their thinking. They learn, but they also need to learn about their learning. Metacognition is the word used to describe this ability; the capacity to monitor, assess, control and change how one thinks and learns. So, phrased less formally, learning to learn involves reflecting upon one's learning and purposefully applying the results of one's reflections to further learning.

It incorporates:

- Understanding the demands made by a specific learning task
- Knowing about intellectual processes and how they work
- Evaluating and generating strategies that are the most suited to cope with the task
- Becoming more successful in selecting effective strategies to cope with the task.

When a child is faced by a new task or problem, attempts different strategies, or ways of proceeding, and 'monitors' how well they are doing in order to complete or solve it, this is regarded as a metacognitive experience.

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Throughout development, as mental habits of mind and consequent behaviours are being formed, the accumulated metacognitive knowledge derived from previous metacognitive experiences leads to increasingly efficient performance. It also ensures that cognitive effort on an activity is increasingly smoothly co-ordinated, automatic and efficient, as it becomes more familiar and practised. Some of this processing is conscious (mostly when unfamiliar tasks are attempted) but much metacognitive activity happens completely without conscious awareness. In these ways specific tendencies or dispositions become habituated into the child's mental frame of reference, observable in their behaviours in approaching further activities.

The significance of a child's ability to monitor and regulate their own cognitions, and to develop increasingly sophisticated metacognitive capabilities, has been demonstrated empirically across a wide range of human development and areas of the educational curriculum. This includes, for example, reasoning and problem-solving (Kean, 2010), mathematics (de Corte, Verschaffel, Eynde, 2003), reading and text comprehension (Maki and McGuire, 2002), memory (Reder, Angstadt, Cary, Ayers and Erickson, 2002) and motor development (Sangster-Jokic and Whitebread, 2011). It has also been well established for quite some time that children with learning difficulties commonly exhibit metacognitive deficits (Sugden, 1989).

Language
Developing metacognitive or 'self-regulatory' abilities have been found to be crucially dependent on language development. Although language starts off as being a tool for social interaction, from around 3 years of age the child begins to guide their own behaviour by using language in self-talk, or as a tool for "thinking out loud." Initially, self-talk continues to function as a tool of social interaction, used in the presence of others and diminishing when the child is alone. However, it gradually becomes a method for directing and regulating the child's own behaviour as, by around 7 years of age, their speech becomes increasingly internalised and transforms into thought, thus allowing for self-regulated, conscious functioning on current tasks. Children use this as a technique for controlling both action and thought to reflect on the reasons and motivations for their own behaviour (Winsler and Naglieri, 2003). Further, having verbal labels allows the child to keep two things in mind at once, and being able to remember verbal instructions enables staying on track in the task (Gordon and Olson, 1998).

Language also assists the young child's developing capacities to reflect and plan by facilitating their mental consideration of alternatives before taking action. As an aid to memory, language helps the child refer backwards in time or project forwards into the future, enhancing learning from past experience for future occasions.

It also facilitates the construction, reconstruction and recombination of material in memory to form new concepts, ideas and solutions to problems (Zimmerman and Schunk, 2001).

As the higher level processing and control systems of the brain mature and children's processing skills become more sophisticated and efficient, they are increasingly capable of reflection on their own thinking processes. Astington and Pelletier (2005) argue that talking about the mind focuses the child's attention on explicit mental explanations

of behaviour, introducing them to a vocabulary of terms for unseen and abstract concepts such as thoughts, feeling, ideas, memories, and so forth that are inaccessible to direct observation. Work by Schraw and Sinatra (2004) reveals that this understanding begins to develop in early childhood; 3-4 year olds are able to use simple verbs for mental operations correctly (e.g. knowing, learning, remembering), but more complex concepts (such as estimating, believing, predicting) are still difficult for children at age 6 years. The development of conscious awareness of cognitive processing marks an important advance in metacognitive control. Children who are capable of metacognitive control can now learn to direct and monitor their learning, thinking and problem-solving activities more reliably and independently. They can become "responsible" for their own learning and thinking, as well as their behaviour, in significant ways, which form the foundations for their development as self-regulating learners.

Motivation

However, importantly, underpinning the employment of both cognitive and metacognitive processes within any learning context are the child's motivation and levels of self-confidence. The child's beliefs about the intrinsic value of any learning activities they undertake, their emotional responses to the activities (i.e. feelings of competency as they approach the learning), their level of interest and the activity's relevance to them on a personal level, will all be factors influencing their motivation.

A range of empirical studies have confirmed the relationships between cognitive and motivational aspects of self-regulation. Schunk and Zimmerman's (2008) edited collection contains reviews of much of the significant work in this area.

This includes work related to:

➔ 'self-efficacy' (Bandura, 2001); children's belief that they can improve their abilities through effort, leading to a 'mastery' frame-of-mind

➔ interest (Dweck, 2000); leading to engagement and involvement frames-of-mind

➔ 'self-determination' (Ryan and Deci 2000); the satisfaction of children's needs for feelings of competence, autonomy and 'relatedness' (positive social relationships).

A further psychological process, which is a facet of self-regulation related to children's awareness and control of their emotions, is behavioural appraisal, a mental practice that enables the analysis and re-organisation of their behaviour at will. The controlling of excitement, the appropriate expression of emotion and the assessment of related behaviours constitute an important part of self-regulated functioning by young children and a large body of research has related emotion regulation to social competence (e.g. Eisenberg, Spinrad and Morris, 2002).

These developments in metacognition, language and motivational awareness and control in the first 7 years enable children to start to learn deliberately, as they are required to do in formal education.

However, it would be a mistake to delay introducing children to important ideas until this stage is reached. As we have seen, important learning can take place through experience and in playful contexts in younger children, both in their own independent activity and through interaction with adults.

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Vygotsky's (1978) theoretical model of human development and learning, socio-constructivism, is characterised by the belief that self-learning comes about through exploration, interaction and reflection. These are key elements of the learning process evolving from the child's critical curiosity within a co-operative learning framework (Schaffer, 2004). In essence, development occurs through a process of engagement and participation in relationships with trusted and caring others who model psychological propensities and processes, and provide opportunities for practising them in real-life situations. Such influential social interactions occur with parents or other caregivers, teachers and peers.

Parenting practices and parenting styles

Parenting practices are defined as particular behaviours that parents use to prepare their child to adapt to a particular social group. For example, when socialising their children to succeed in school, parents might practise particular habits with them, such as doing homework together, as well as providing their children with time to read and the materials with which to work, and attending school functions (Pino Pasternak and Whitebread, 2010). Constructs such as levels of parental involvement, parental monitoring and parental goals, values and aspirations in relation to their child's education are affected by a range of factors, including socio-economic status (SES).

Parenting style, on the other hand, can be seen as the emotional climate in which a child is raised. Parenting styles have been characterised by dimensions of parental responsiveness and 'demandingness' (Baumrind, 1971), which interact to produce four broad categories of parenting:

	High parent responsiveness	Low parent responsiveness
High parent 'demandingness'	Authoritative; negotiating rules and guidance whilst having high expectations of the child	Authoritarian; telling child what to do and rigidly enforcing rules
Low parent 'demandingness'	Indulgent; Allowing child to do whatever they wish	Negligent; Disregarding the child

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Parenting style is largely based on the influence of one's own parents and culture, as well as being affected by both the parents' and children's temperaments (Whitebread and Basilio, 2012). Perhaps unsurprisingly, the evidence consistently finds that the 'authoritative' parenting style is associated with a range of positive academic and well-being outcomes (eg. Grolnick, 2009). Early sensitive parenting is associated with higher level of children's general abilities to regulate their cognitive functioning (Lugo-Gill and Tamis-LeMonda, 2008), their emotional behaviours (Sroufe, 1996) and with a well-regulated stress physiology (Gunnar and Quevedo, 2008).

Parenting practices and styles in relation to their children's activities in the early years have a powerful influence upon the child's cognitive ability (e.g. Melhuish et al, 2001, 2008; Grolnick and Ryan, 1989). Practices such as reading and using complex language, as well as dispositions such as responsiveness and warmth in interactions are all associated with improved developmental outcomes (Bradley, 2002). Such practices and dispositions may not only support the child to acquire skills directly, but also thereby develop their motivation and disposition towards learning in general (eg. Grolnick, 2009; Melhuish, 2010; Love et al, 2005). The implications of this work for parenting classes are discussed in a later section.

Teacher influences

Several studies have examined how children's dispositions and behaviours in school relate to the quality of the pupil-teacher relationship. Throughout the challenging and novel school environment to which the child must adjust from as early as 3 years of age, when they enter a nursery school or class, a high quality pupil-teacher relationship supports the child through offering praise, encouragement, guidance, and discipline (Pianta, Steinberg and Rollins, 1995). Over the course of the academic year spent in Reception (4-5 years old), teachers expect children to be able to increasingly regulate their frames of mind and behaviours appropriately in line with

clear and conscious goals, or 'classroom rules'. They are expected to delay, defer and accept changes without becoming aggressive or disorganised by frustration, and cope well with high arousal, whether due to environmental challenge or fatigue (Sroufe, 1995). As this socialisation proceeds during the Reception year, teachers begin to shift control to the child in age and skill appropriate ways; this social competence requires emotion self-regulation and social knowledge, pre-dispositions and specific social skills (Katz and McClellan, 1997). By the age of seven years, teachers require the child to exhibit increasingly sophisticated aspects of social competence, such as overcoming shyness (Coplan and Armer, 2005) improved social skills such as appropriate eye contact and knowing when to start, prolong and curtail a conversation, for example, as well as the ability to inhibit negative behaviours (e.g., aggression) and to comply increasingly with classroom display rules (Porges, 2003). Teachers of seven year old children and beyond have low tolerance for behaviourally disordered children who do not exhibit appropriate social behaviour; they interact with these children in a more negative, critical, and punishing manner (Coie and Koeppl, 1990).

Several observational studies of early years and primary school classrooms have identified characteristics of classroom environments which impact upon children's developing self-regulatory abilities. For example, Perry (1998) observed 2nd and 3rd grade classrooms in Canada (6-8 year olds) doing literacy activities over a period of six months. Based on her observations she identified two different types of classrooms: High and Low self-regulated learning (SRL) classrooms.

High-SRL classrooms were characterised 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 strategy instruction and encouragement of a mastery-oriented approach fostering positive feelings towards challenge and emphasising personal progress and mistakes as opportunities

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for learning. In contrast, in Low-SRL classrooms children were more likely to be engaged in restricted types of activities with limited choices. Evaluation procedures were mainly controlled by the adult and were similar for all students emphasising performance and triggering social comparison. Students in the High-SRL classrooms were more able than the students in the Low-SRL classrooms to engage in systematic and strategic approaches towards the tasks, operating in a flexible way and seeking assistance appropriately. Further, while the students in the High-SRL classrooms showed prevalence of a mastery-oriented approach (i.e. children showing intrinsic motivation to engage with challenging tasks) which was evident even in students with low ability, the students in the Low-SRL classrooms were more prone to avoid engagement in challenging tasks and to show motivational vulnerabilities (i.e. quickly giving up when faced with a difficulty or challenge) Perry, Vandekamp, Mercer and Nordby, 2002). Significantly, the evidence further suggests that well self-regulated children are relatively immune from the effects of different classroom environments. Poorly self-regulated children, on the other hand, are much more dramatically affected.

Peer influences

Success in establishing friendships is a central issue in development during the early years period and depends upon a child's ability to develop an attitude of negotiation and reciprocity, to regulate emotions and control behaviour appropriately in relation to the peer group (Eisenberg, Hofer & Vaughan, 2007). Simply being with other children is insufficient to create social competence (Clarke-Stewart, Gruber and Fitzgerald, 1994); inadequate, unsuccessful or aggressive patterns of interaction may continue into adolescence. Children under the age of 7 years still frequently require adult assistance to inhibit impulses, solve social problems and to strengthen pro-social attitudes as well as accommodating peers' individual differences, other children's desires, suggestions or needs and to cope with frustration (Katz and McClellan, 1997).

By 3 to 4 years of age, the majority of both boys' and girls' social interactions are with members of the same gender (Fabes, Shepard, Guthrie and Martin, 1997; Maccoby and Jacklin, 1987). Cross-cultural research also confirms the prevalence of this pattern of social interaction (e.g., Carter, 1987). Through the primary school years the proportion of same-gender peer preferences increases; for example, Maccoby and Jacklin (1987) reported that 6 1/2 year-olds interacted with same-gender peers 11 times more often than they interacted with other-gender peers.

Media Influences

In the UK, fouteen years ago, 63% of all children aged 2–18 years had a television in their bedroom, with substantial proportions of 2-4 year olds (26%) and 5-7 year olds (39%) enjoying such freedom (Livingston and Bovill, 1999) to spend an average of 2½ hours each day watching TV. The Young People New Media survey (Livingstone, 2002; Livingstone and Bovill, 2001) showed that in British children's bedrooms, around the same time, 21% of 6-17 year olds had a video recorder, while 34% had TV-linked games. Just a few years on, the 'UK Children Go Online' project, in updating this work, found that 19% had internet access in their bedroom (Livingstone and Bober, 2005). Clearly, the current position is likely to have developed even further.

The results of several studies support the hypothesis that childhood television viewing may contribute to the development of attention problems and suggest that the effects may be long-lasting (e.g. Landhuis et al., 2007); the hypothesis has been that frequent changes in scenes and content disrupt young children's ability to sustain attention. A study by Christakis, Zimmerman and Di Giuseppe, 2004 found that early exposure to television during critical periods of synaptic development in the brain to be associated with subsequent attentional problems and a re-analysis of longitudinal data collected during the 1980s (Singer, Zuckerman and Singer, 1980) found a small correlation between early television exposure at ages one and three years

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and subsequent symptoms of attention problems at age seven (Obel et al., 2004). In another study, early exposure to violent and non-educational entertainment programming was positively associated with later symptoms of attention deficit but exposure to educational television was not related to attentional problems (Mistry, Minkovitz, Strobino and Borzekowski, 2007).

Several studies have found that academic achievement is linked to early exposure to educational television programming (Bryant, Alexander and Brown, 1983; Fisch, 2004); these studies demonstrated immediate and potentially long-lasting effects of some educational programmes on problem-solving skills, especially for regular viewers of the programmes. Another extensive study reported that viewing educational programming at age five was positively associated with high school grades in English, maths, and science (Anderson et al, 2001); Early exposure to educational programming was also positively linked with a range of other factors such as leisure time reading and involvement in extracurricular activities.

Of course, there are dangers in attributing causal links from these studies of TV viewing and various measures of ability and achievement. It could easily be, for example, that watching large amounts of 'entertainment' or 'educational' TV are associated with a range of other parenting and home environment factors, and it is these, rather than the TV viewing per se, that have an influence on subsequent development.

There is little evidence of significant success in improving children's educational outcomes through the use of digital technologies in schools, in spite of the fact that between 2007 and 2012 more than £1 billion was spent on items ranging from interactive whiteboards to tablets in classrooms.

In 2012, Nesta commissioned the London Knowledge Lab (LKL) and Learning Sciences Research Institute (LSRI), University of Nottingham, to analyse how technology has been used in the UK education systems and lessons from around the world, in order to better understand the impact on learning experiences. The researchers examined 1,022 academic papers, multiple blogs and reviews from the UK, continental Europe, America and Asia. From this pool they identified 124 research and 86 teacher–led example cases of innovation which were backed by sound evidence. Starting from a focus upon the types of learning that children do in classrooms, (such as 'learning through making', 'learning through enquiry') the researchers asked whether technologies are making learning more effective. The report acknowledges that empirical evidence relating to the 'success' of digital technology in classrooms is embryonic and that an early mistake, that of 'putting the technology before the pedagogy' has led to technological development for commercial reasons in some cases. Nonetheless, Decoding Learning (Luckin et al, 2012) finds evidence of much high quality technology supporting effective learning; that emerging technologies show the potential to have strong effects upon attainment when used to enhance and link proven learning practices; but that the overall potential of effective digital technologies in schools will be realised primarily through innovative teaching practice. The report concludes that success will come from commercial developers, researchers, teachers and learners working together to develop, test and spread imaginative new technologies (Luckin et al, 2012, p. 63).

Advertising

Advertising influences preschool and primary school-aged children on many levels, including the relatively immediate product-persuasion effects intended by the advertiser, as well as more cumulative types of influences that accrue from exposure to large numbers of commercials over time. Being able to recognise that advertisements differ from programmes appears to emerge early on in development, but young children do not realise that a message can portray only positive information, whilst withholding negative information, in order to manipulate another's mental state (Aloise-Young, 1993; Bennett and Yeeles, 1990). Further, there is evidence that young children do not question the authoritative status of television messages, and the younger the child is, the more likely they are to believe that advertisements always tell the truth (Oates, Blades and Gunter, 2002).

Dorr's literature search (1986) found that it is only between 7 and 9 years of age that children understand the persuasive intent of advertising. In a study by Gaines and Esserman (1981), only 1% of 4- to 5-year-olds realised that the goal of an advertisement was ''to try and make you buy things'', rising to 28% in 6- to 8-year-olds.

The explosive growth of the Internet is ushering in a new digital media culture, but this emergence is seen by some as a double-edged sword for children (Montgomery 2001). Children are embracing the new technologies much more rapidly than adults, and it is possible that the power of digital technology could be harnessed as a beneficial force in the lives of young people, opening up new opportunities for self-expression, learning, and community.

On the other hand, because of their increased spending power, children and youth have become a valuable target market for advertisers; web sites and other forms of new-media content specifically designed for teens and children, have burgeoned in recent years.

There is growing criticism over the ways in which children's rights to privacy may be violated by online advertising and unfair or deceptive practices and concerns have been voiced relating to the 'commercial' dangers of the internet, such as the rise of user data–collection practices, and the migration of violent video games to on-line media. In the US, The Centre for Media Education has identified several new forms of online marketing practices targeted at children, including 'branded communities' and 'viral marketing', and has expressed concern over the economic pressure towards alliances between civic sites and commercial ventures, believing that the increasing commercialization of the web could create a media environment that may be harmful to children (Montgomery, 2001; Turow, 2000).

Techniques are frequently employed to enhance the appearance of a product of course, in digital media and television advertisements – a fact which adults understand and take into account when assessing the product, but which young children before the age of 4 or 5 years are 'taken in by' (Bartsch and London, 2000). There is evidence that young children are heavily affected by product factors and do not understand that appearances can differ from reality (Flavell, Flavell, Gree and Korfmacher, 1990). The ability to distinguish reality on television from fantasy appears after the age of 4 years (Berry and Keiko Asamen, 1993), by which time children typically develop the appropriate cognitive skills, including a 'theory of mind'.

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A study by Pine and Nash (2002) found that increasing amounts of commercial television watched by young children were matched by an increase in the overall amount of toys requested. In other words, there is a general effect of advertising on children's desires and evidence of young children's susceptibility to the persuasive intent of commercials. However, with the exception of two well-established products, there was an overall lack of a relationship between the branded products requested and the frequency of televised advertisements for them. Pine and Nash interpreted this to mean that advertisements may not have an individual impact on the under-7s, but may simply contribute to a general increase in desire.

More cumulative types of influences accrue from exposure to large numbers of commercials over time (APA report, 2001). Preference for one brand over another can result from exposure to seeing a commercial just once (Resnik and Stern, 1977; Goldberg and Gorn, 1978), although stronger effects are more likely to result from repeated exposure (Gorn and Goldberg, 1982). Both Atkin (1978) and Galst and White (1976) found that the amount of television viewing was a significant predictor of the frequency of children's product-purchase requests at the supermarket; 75% of all parent–child exchanges about products were child demands for merchandise advertised on television. This pattern has been observed more recently in other countries as well; Buijzen and Valkenburg (2000) reported that Dutch children's requests for Christmas gifts were significantly related to their television viewing and cross-cultural research comparing families from Japan, England, and the United States has demonstrated a positive relationship between children's amount of television viewing and their product-purchase requests (Robertson, Ward, Gatignon, & Klees, 1989). The cumulative impact from the amount of advertising seen by children may exert far broader sociological influence and it has been argued that advertising cultivates a materialistic value system in young people (e.g. Baran, Mok, Land, and Kang, 1989).

Children who are exposed to many adverts are thus educated about a particular lifestyle and they learn certain attitudes related to the role or importance of money, what products are needed, how they are to be used and how products are supposed to make them feel. Seen thus, materialism can be defined as the view that products and their acquisition are the basis for determining one's personal worth.

Material possessions become the source of judgment by others as well as the source of one's own self-evaluation. In the US, Adler et al. (1980) found stronger materialistic values among fourth to seventh graders who were heavy television viewers than among their lighter-viewing classmates. In addition, Bachmann, Roedder & Rao (1993) found that as children progress from early childhood to adolescence, they develop an awareness that peer groups are an important influence in some types of product decisions.

However, children under 8 years had not yet developed an understanding of the social significance of using products in different contexts, nor of the difference between luxuries and necessities.

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Parent/Caregiver Education

In England, informal parent support is currently provided by a variety of people such as lay mothers, health visitors, social workers, teachers, and nursery nurses. They either provide help and advice on an ad hoc, demand-led basis or facilitate informal support programmes. There are also however more formal types of parent support programmes, which aim to give parents the skills to identify, define, and respond to problem behaviour. These programmes often use a group work approach and are relatively structured and replicable. Parent education is a systematically and conceptually based programme, intended to impart information, awareness or skills to the participants on aspects of parenting. It aims to be both a solution to child behavioural problems and a means to prevent progression to more serious illness. Effective parenting programmes seek to help parents develop skills in perceptiveness, responsiveness and flexibility (Scott, 2010).

Parenting programmes can be generally divided into two broad categories:

➔ relationship focussed approaches

➔ behaviourist approaches.

Relationship-focussed approaches use techniques like active listening, understanding and acknowledgement of a child's feelings. Parents are encouraged to use natural and commonsensical consequences to control children's behaviour. Behavioural approaches are based on observable child behaviour and the environmental factors that initiate and sustain behaviour patterns. Behavioural programmes use specific techniques to reinforce desirable behaviour and control undesirable behaviour, usually involving structured reward systems for 'good' behaviour. Randomised controlled trials attest to the effectiveness of many of these parenting programmes in improving child outcomes and in treating conduct problems (Allen, 2011). Such programmes are based on the premise that many children develop problem behaviours because parents lack, or inconsistently

use, key parenting skills, and that these skills can be improved (Hutchings, Gardner and Lane, 2004). Interest in evidence-based parenting programs in the UK has increased in recent years as policy-makers seek proven and cost-effective methods of improving child well-being (Klett-Davies, Skaliotis and Wollny, 2009).

Shaping young children's financial behaviours

Initially, young children will participate in practices alongside their parents, teachers and significant others without really understanding their bases (Bodnar 2005; Roland-Levy 1990).

Yet children, being essentially social learners, acquire cultural practices effortlessly and gradually assimilate ''values, attitudes, standards, norms, knowledge, and behaviours that contribute to [their] financial viability and well-being'' (Schuchardt et al., p.86, 2009).

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For example, when a child first receives 'pocket money', or first deposits money in a piggy bank, he or she is probably being encouraged and led by a significant adult (parent, grandparent) and it is the social and emotional motivations for interaction which instigate these behaviours.

The enjoyment of doing something with the parent, the familiar habit of the weekly shopping trip or the feeling of mastery in participating in "adult" activities like going to the bank, provide sufficient meaning and motive for young children.

It is suggested that interventions to introduce or change young children's financial behaviours should take advantage of such motivations. Children develop financial and economic understanding when they have ''personal economic experiences'' (Schug and Birkey 1985, p. 41). For example, sources and amounts of money that children control influence their learning (Doss Marlowe and Godwin, 1995; Furnham 1999; Meeks 1998). If parents and teachers support and model specific decision-making, it is probable that children will engage in the behaviour and potentially develop such financial habits (Beutler and Dickson 2008; Furnham and Argyle 1998).

In a wide-ranging review of financial socialization in families, Rettig and Mortenson (1986) found evidence that children learn from observation, instruction, and practice.

Although young children under the age of seven years are unlikely to develop sophisticated understanding or conceptions about the processes underpinning such practices, they do develop a limited understanding relating to why they are done, and how they are effective (Holden, Kalish, Scheinholtz, Dietrich and Novak, 2009).;

Lau 1998; Roos et al. 2005). Social context also shapes economic beliefs, attitudes, and values, leading to different levels of knowledge and financial behaviour (Bowman, 2010). The delineation and abstraction of the specific set of structures and processes involved in many financial behaviours may be attempted when further cognitive maturation has been achieved.

Interventions to support young children's financial cognitive development

As we have seen, the ability of very young children to understand concepts - including basic financial concepts - is dependent upon their cognitive development. Interventions and policies intended to shape or 'lever' children's habit formation, need to take into account the different level of cognition among young children, since pitched too high, they may have little educational impact or, at worst, may confuse or mislead children.

By the age of seven years, several basic concepts relating broadly to later 'finance' behaviours will typically have developed. These are outlined below.

Counting

Very young children can often be seen counting objects in a set more than once and either stopping arbitrarily or not knowing when to stop. Between 2 and 3 years of age, children are able to distinguish counting words from other labelling terms (Wynne, 1990) and by four, many children are able to express counting concepts (Gelman and Merk, 1986) such as one-to-one correspondence (understanding that when counting a set of objects, each object needs to be counted); stable order (knowing that numbers are stated in the same order all the time); order irrelevance (the order does not matter as long as each object is counted once; abstraction (that

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anything can be counted as long as the items in the set can be distinguished) and cardinality that the last number stated/counted represents the total number in the set. A child can usually understand the concept of 'equals' by the age of five years.

Interventions to support acquisition of counting concepts

Children are likely to gain knowledge about counting through real world encounters; they are often asked to count things (cakes on a plate, chairs around the table etc.). Parents and teachers demonstrate counting for them. The principles of counting are reinforced via these experiences and so are new theories that children are constructing about numbers and counting. Comparing two or more objects by one feature at a time is a useful game which teachers and adults can play with young children (e.g. five year olds). Using comparative language, such as bigger/smaller or heavier/lighter, can help the child isolate and contrast essential characteristics, noticing similarities and differences.

Conservation

Understanding money transactions requires an understanding that value is not measured by coin size; in other words, it is not the case that because a coin is bigger in physical size that it is also bigger in value. If given the choice of 5 pennies or one five pence piece, the very young child will probably choose the 5 pennies because it seems 'more'; it is difficult for them to account for both amount and relative worth of the coins at once. However, typically by the age of 7 years the child is able to cognitively 'represent' value.

Interventions to support acquisition of conservation concepts

Children need executive function improvement to inhibit their erroneous intuitive perceptual responses and acquire the conservation principle (Houdé and Guichart, 2001). Teachers and parents can support the development of children's executive functions, especially their capacities to inhibit, in ways described below.

Concepts of exchange and equivalence

Understanding money exchanges requires a sense of giving and receiving and of equivalence. Differentiating between 'wants' versus 'needs' (and choosing between alternatives) is cognitively and emotionally demanding for very young children. Three to four year olds know what money is for within a shopping context and can explain that it is used to buy things, but are nonetheless seen to handle and want to take goods without paying (Berti & Bombi, 1988). With age and familiarity with shopping situations, they become more aware of 'prices' and the rules that are involved in exchange.

> **By four to five years, children understand that they need to pay for merchandise, but may not understand that coins have different values.**

By five to six years of age, children understand that some denominations do not carry enough value to buy some items. It is not until children approach seven years of age that they begin to understand money can be exchanged for goods and that 'change' is returned by the shopkeeper only when denominations larger than the cost of the item are offered by the purchaser (Berti and Bombi, 1988). Further abilities to 'represent' are

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required to understand that "money" and goods can be exchanged through credit cards and cheques, which are not themselves the "money" behind the exchange but 'represent' value. However, it is probably not until after the age of seven that children begin to understand that exchanges involve a set of unseen transactions among other parties (de Clercq, 2009).

Interventions to support acquisition of concepts of exchange and equivalence

Since some young children have difficulties understanding that money needs to be 'given up' in a transaction, it may be helpful for parents and teachers to initiate situations in which the child is encouraged to use real money to make purchases – in order to teach the lesson that money can be spent only once. Often a young child might expect to have more sweets after buying and eating up their packet, or they might expect to be able to change their minds about a purchase and have something different without paying out more money for it. Parents can make special 'one pound' shopping trips to reinforce this concept of exchange; giving the child one pound to spend in the toy or sweet shop means that the child will need to focus carefully on choosing which item they really want, so they will not be disappointed later – and then giving their pound up for it. That pound is then 'gone for good'.

Concepts of 'earning' and 'income'

Many children receive a regular "income" in the form of 'pocket money' and thereby, many children's understanding of income is shaped by this cultural practice. For young children, pocket money is often seen as a sign of parental approval, or a way of being kind; Yamamoto and Takahashi (2008) found that the financial significance of 'pocket money' (i.e. a grant of money) does not become understood

until children reach early adolescence. Younger children especially are unlikely to understand an allowance as a form of wage, although they become aware that adults work for payment (a 'wage').

Interventions to support acquisition of concepts of 'earning' and 'income'

Talking about the different types of work that adults do, and the different amounts of money that are awarded for different types of work, is a valuable way to raise children's awareness of 'earnings'. Allowing the child to take on small-scale 'jobs' around the home for pocket money may be a method of adults bringing to life for children the concept of 'earning' money, or in other words, giving up time and effort for a monetary reward. As children age, they have more experiences in this realm, thus more opportunities to fine-tune their understanding. Children will probably experience an occasion on which they themselves, or a parent, may not be able to afford a particular purchase or else might not be able to obtain money when they require it. 'Window-shopping' provides good opportunities to discuss facts relating to not being able to afford everything that is wanted, but that another individual possibly can. These experiences provide a salutary environment in which to reason about equality or inequality in the economic world and perhaps even fairness or justness.

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The development of Executive Functions

Until a child has reached a point of some sophistication in the development of their executive functions, they are unable to plan and delay gratification – two abilities at the root of financial concepts such as saving, for example.

Abilities to plan ahead

A concept of 'the future' is fundamental to many aspects of financial understanding. For example, the process of saving requires a child to have a sense of their future self that is different from, but also an extension of their current self. Saving relies upon an individual differentiating between 'now' versus 'later' as well as being able to delay their gratification, or in other words, being willing and able to decline a small reward in the present for a larger reward in the future.

Research has shown that children develop the ability to differentiate the times of future events between the ages of 4 and 10 years, but 4-5 year olds are very limited in being able to distinguish future distances, confusing future events with events that have happened in the recent past and not even giving longer estimates that are months in the future than from events that will occur in the next days or weeks (Friedman, 2000). Seven year olds are unable to judge future distances beyond about one month but it seems that by approximately eight years, when children typically become able to recite the months of the year in sequence, they become able to consistently judge the times of future months from different starting points within the year.

Interventions to support making the concept of 'future' more tangible

Making the concept more concrete, by linking it to a meaningful event, such as a birthday or holiday (Friedman, 2000), or conveying a near date as being a measurable number of 'sleeps' away in time helps parents and teachers to ground the concept in terms that are more real for children.

> **To help children 'practise' waiting until they have saved enough to be able to buy an object of desire, they may benefit from tangible activities such as making a savings chart, indicating how much money has been saved (by, for example colouring in some coins on the chart) and how many more need to be saved (remaining uncoloured).**

Interventions to support giving children experiences in choice-making

Several studies have found that children join in simple 'saving' behaviours not because they understand the concepts behind this form of 'delay of gratification', but because they enjoy participating in an "adultlike" behaviour, or wish to comply with parental expectations (e.g. Deci, Connell and Ryan 1989; Moller, Deci, Ryan, 2006). Several studies suggest that supporting young children in learning to exercise conscious control over their own decisions rather than 'automatically' choosing the most immediate or attractive option, can be successful – for example, Hom and Fabes (1985) revealed specifically that if children are involved in the decision-making process and thereby understand the choices they have, for example in relation to the type of reward to be received afterwards, the act of delaying is accomplished more successfully (and see Webley 1996).

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Several studies have shown that younger children can be helped to make choices in delay of gratification situations if they are taught strategies to help deal with the delay. Such findings offer bases for parents or teachers in supporting children in choosing between having and spending money immediately, or saving it for later spending instead. For example, if the child is taught 'distraction techniques' to take their mind off the desirable immediate choice (or the most attractive characteristic of that choice) they find it less difficult to delay (Mischel, Shoda and Rodriguez, 1989). So parents can distract the child from their immediate desires to spend by helping them to plan and think about an attractive alternative (such as going for a bike ride), which might help them overcome any inclination to make an impulse decision. Alternatively, the adult might direct the child's attention towards the specific item of desire in order to influence the child's decision making as a strategy to delay gratification; for example making a game of focussing upon the design of money notes and encouraging the child to collect one of each of a five pound note, a ten pound note and so on, so that they can see the different images on each.

Shopping experiences help to demonstrate buying decisions to children. A young child might help their parent compile a shopping list of needed items for the home; lists help people to prioritise what is needed (sometimes in preference to what is desired) and they help people to plan how much to spend – thereby helping them not to overspend. The child may enjoy accompanying the parent to the shop. Becoming aware of price labels on items, comparing prices, choosing items which are less expensive or that are 'on sale', deciding which size packet to buy, how many packets and how much money to spend in total may be decisions in which the child can observe or participate. An important financial lesson may present itself; that if there is not enough money to buy a certain item, a decision between two choices then becomes necessary by the shopper, who needs to opt either to buy a less expensive item or wait until another occasion, when enough money may have been saved up. Opportunities to explain the bigger financial picture can be taken by parents in the daily decisions about how to spend time; for example, going to see a film involves not just the price of admission, but petrol for the car, popcorn or snacks and drinks, time and energy. This will help children be more aware when making financial decisions. Understanding the concept of borrowing can be supported by parent and child actively borrowing an item, paying for the opportunity to loan the item and then later returning it (e.g. a book from the library or a hiring video from a shop).

In summary, since they are dependent upon parents and have few property or monetary resources that they control independently, a 'lever' aiming to teach young children explicit forms of financial 'curriculum' knowledge, is likely to be ineffectual in shaping or changing their behaviours.

However, there are basic approaches and skills which can be modelled, discussed and demonstrated by parents with young children, such as the basic benefits and tools of sharing, saving, and purchasing that will instil efficient habits and practices.

A key point here is that situations need to be constructed so that the child experiences the process or idea rather than just being told about it.

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Teachers

The findings of Boekaerts, De Koning and Vedder, (2006), summarising research on the classroom practices that facilitate or undermine the quality of students' engagement in the classroom are insightful. The clarity and pace of the teacher's instruction, the amount of structure provided, the amount of autonomy granted, the teacher's enthusiasm, humour and fairness, as well as their expectations about students' capabilities are influential upon the way children self-regulate their learning (Boekaerts et al, 2006).

The pupil-teacher relationship has been shown to predict academic success over several years (Hamre and Pianta, 2001; Pianta and Stuhlman, 2004). More specifically, the pupil-teacher relationship affects children's motivation to learn. Children who are highly motivated and self-confident are more engaged in the learning process (Deci and Ryan, 1985). A positive, warm relationship with a teacher motivates students to achieve to please their teachers (Urdan and Maehr, 1995). Furthermore, teachers use a warm and positive relationship with their students to encourage and reinforce appropriate self-regulatory behaviours that are important for learning (Tyson, 2000). Conversely, children who have a relationship characterized by conflict with the teacher are less engaged in the classroom and are more likely to struggle academically (Ladd and Burgess, 2001). Removing students from a supportive teacher relationship to one in which they perceive lower support decreases academic motivation (Midgley, Feldlaufer and Eccles, 1989). Thus, it is clear that the student-teacher relationship is important in promoting children's academic success via classroom engagement as well as improved motivation.

School interventions shown to foster executive function development in young children

An extensive literature developing and evaluating educational interventions intended to promote metacognitive and self-regulatory abilities has shown that they are highly teachable. Dignath, Buettner and Langfeldt (2008) have recently completed a meta-analysis of studies focusing specifically on children of Primary school age and found consistently positive outcomes from a range of interventions. Typically, these interventions have involved making metacognitive and learning strategies explicit, by encouraging children to reflect upon and talk about their learning. Several pedagogical techniques of this kind have been investigated and developed, all of which are effective in supporting young children's new knowledge or skill acquisition through guiding their reinforcement of the new learning.

These include:

➡ 'co-operative groupwork' (Forman and Cazden, 1985): a range of techniques involving children in collaborative activites which oblige them to articulate their own understandings, evaluate their own performance and be reflective about their own learning.

➡ 'self-explanations' (Siegler, 2002): an instructional practice which requires children to give 'how' and 'why' explanations about, for example, scientific phenomena or the events in a story, and then asks children to give explanations of their own and an adult's reasoning.

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➜ 'self-assessment' (Black and William, 1998) a range of pedagogical ideas involving children's self-assessment of their own learning, including, for example, children making their own choices about the level of difficulty of tasks to be undertaken, and selecting their best work for reflective portfolios.

➜ 'debriefing' (Leat and Lin, 2003): a range of techniques for reflecting upon an activity or piece of learning including 'encouraging pupils to ask questions', 'making pupils explain themselves' and 'communicating the purpose of lessons'.

A series of specific interventions have been shown to support the development of executive functions in young children; successful programmes tend to involve repeated practice and progressively increase the challenge to executive functions (e.g. Blair and Razza, 2007). The objective behind such interventions is to foster a child's creativity, adaptability, self-control, and self-discipline, not just for school learning, but for life-long learning, in which abilities will be required in all sorts of circumstances to 'think laterally', give a measured rather than an impulsive response, to persist and stay focused. A range of activities have been shown to improve children's executive functions: computerized training, non-computerized games, and specific school curricula. Although not yet very plentiful, the existing literature intended to support children's development in these skill areas supports the plausibility of improving self-regulation through relatively short-term interventions.

Media literacy training

Research in a variety of topic areas has explored the potential for negating some of the media's undesirable influences by increasing children's critical viewing skills through media literacy training (Brown, 1991; 2001). There is a small body of evidence testing the effectiveness of school-based media literacy programme efforts (Boush, 2001; Brown, 1991; 2001), including the knowledge that commercials are meant to persuade and therefore must be viewed cautiously. However, since children under the age of 8 years focus more on how something looks than what is said about it (Hoffner, Cantor, and Thorson, 1989; John, 1999), if the visual aspects of an advertisement contradict the semantic meaning of an intervention, young children's reactions are likely to be dominated by the impression made by the visual, with little impact from the modifying words in the media literacy training effort. Comprehension of material provided in an intervention strategy may also be limited among younger children, due to immaturities in vocabulary (Cantor and Wilson, 1984), in inference-drawing (Collins, 1983), and in understanding sentences with complex grammatical forms (Wilson and Cantor, 1987). One study has recorded a reduction in children's desires for the advertised products as the result of a media literacy training effort (Feshbach, Feshbach and Cohen, 1982). On the whole however, given the typical immaturities in children's cognitive development below the age of 8 years, it seems unlikely that media literacy training can play a significant role in alleviating concern about the fairness of advertising to children.

Conclusion

In summary, the evidence indicates that teaching young children explicit forms of 'financial' knowledge per se is likely to be ineffectual in shaping or changing their behaviours.

Since young children are dependent on parents and have few material goods or monetary resources that they control independently, it is the basic approaches and skills which are modelled, discussed and demonstrated by parents and other significant adults, that are likely to be influential 'levers', instilling efficient habits and practices. Opportunities for parents and teachers to support a child's capacities to defer gratification, to understand the 'future' in concrete terms , to talk about their understanding and new knowledge, all aid the development of a child's executive functions, underpinning their self regulation, including the implementation of any 'habits of mind'.

With maturity and in appropriate contexts, such self regulation will include the basic benefits and tools of sharing, saving, and purchasing that occur in everyday situations.

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