ENCYCLOPEDIA
on Early Childhood
Development

Preschool and Learning-Related Skills

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Introduction and Subject

Early childhood programs in many countries are seeking to implement academic programs to prepare children more efficiently for reading and math instruction in elementary school. According to critics the emphasis on academic content and direct instruction might be at the expense of promoting important learning-related skills, such as executive functions and self-regulation. Recent evidence suggests that a narrow focus on academics in preschool education might be mistaken because when the demands on comprehension, creativity, independent work and cooperative learning increase in later years, children may not be sufficiently prepared to cope.[1,2] School readiness is more than the child's ability to sit still, hold a pencil and put on coat and shoes independently. It is also more than having acquired phonological awareness, letter knowledge and counting skills in preschool. School readiness includes important learning-related skills, such as the child's ability to express thoughts, wants and needs verbally, to control his or her emotions, and to show curiosity, concentration, persistence and social competence.[2,3]

Learning-related skills in early childhood

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Depending on the research tradition, learning related skills are referred to either as executive functions, self-regulation ability, or metacognitive and meta-emotional skills, but these different concepts are clearly related.

Executive functions

Executive functions refer to systems in the brain that increasingly come to control information processing and behaviour in the course of development.[1,4] Commonly, three basic executive functions are distinguished: working memory (also called updating), inhibitory control and flexibility (also called shifting), but there is a debate whether these functions are already distinguishable in young children.[5] Working memory refers to the ability to hold a limited amount of information temporarily active for processing and updating. Inhibition refers to the ability to inhibit a predominant (but inadequate) response and to resist interference by distracting stimuli. Flexibility refers to the ability to switch between rules or strategies, and to change the mind-set. In addition, higher order executive functions are distinguished such as planning, monitoring and creativity. All executive functions share involvement of executive attention, a brain network that controls allocation of resources ("activation") to different information processing systems in the brain.[6]

Emotional self-regulation

Self-regulation refers to adapting behaviour to situational demands in view of important goals while inhibiting the impulse to obtain immediate rewards. Individual differences in delay-of-gratification have remarkable long-term predictive value.[7] Observing how young children cope with delaying gratification reveals the involvement of working memory (holding goal representations temporarily active), shifting attention (looking away from the attractive reward), and behavioural inhibition (holding the hands behind the back or under the table). Development of self-regulation in early childhood is related to the development of executive attention – the ability to deliberately shift attention to cognitions that can counter-act undesirable thoughts or actions and can motivate to desirable thoughts or actions.[6]

Self-regulation in learning

Self-regulation in the education tradition incorporates both general metacognitive knowledge of how to approach a learning task or a problem and domain-specific metacognitive knowledge of appropriate problem-solving strategies.[8] Also in educational approaches, self-regulation includes

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the ability to postpone immediate satisfaction to attain long-term goals, the ability to mobilize energy and to sustain attention, to resist distracting information and to shift flexibly between mind sets. Ideally, learning is driven by intrinsic motivation, that is, by an authentic interest in the subject matter and in the activity of learning, but truly intrinsic motivation may be rare among students. Internalized extrinsic motivation means that a student has come to attach positive emotion to educational activities, feels competent in learning and identifies with the teacher. Fostering this type of motivation might be an important objective for education and may strongly depend on positive social relationships with the teacher, a positive classroom climate, balance between student and teacher concerns, appropriate feedback and experiences of competence.[9,10]

Self-regulation in Vygotskian theory

Self-regulation is also an important concept in Vygotskian theory where developmental progress from being regulated externally by others (e.g. parents, teachers, peers) to self-regulation applies to a broad range of skills, not just cognitive and emotional control, and captures how well a child integrates knowledge, skills and problem-solving strategies with goal-directedness, motivation, persistence, planning and control. The transition from other-regulation to self-regulation in Vygotskian theory involves observation, imitation, dialogue and co-construction through coordination of looking, gestures and overt negotiation. In instructional interactions with an experienced teacher, verbalized metacognitive thinking, for example planning, monitoring and switching, is modeled. Internalization of expert skills may involve an intermediate stage involving private speech, or “self-talk,” that resembles the explicit metacognitive thoughts of the expert.[11] Self-talk and internalized speech are important tools of children’s cognitive and emotional control.

‘Hot’ and ‘cool’ executive functions

Are control functions for cognitive behaviours (‘cool’ executive functions) and emotional behaviours (‘hot’ executive functions) related? And how does motivation influence learning? A study with preschoolers using assessments from the cool and the hot tradition suggests considerable overlap, with both cool and hot executive functions predicting early academic achievement.[12,13] A central role in cognitive and emotional control is attributed to executive attention. When adapting to situational demands, executive attention allocates resources to cognitive versus emotional processing. For example, the presence of strong emotional cues can

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hamper learning by withdrawing resources from cognitive processing,[14] whereas mild positive emotions and positive mood states may increase resources for cognitive processing and improve learning.[10,15]

Promoting learning-related skills

Early measures of executive functions and self-regulation predict academic achievement in reading and mathematics better than IQ[16] and also behavioural adjustment and well-being in the classroom, empathy, moral reasoning and prosocial behaviour.[17] Promoting learning-related self-regulation, therefore, should be a core objective in early childhood programs. Different approaches are possible: training of specific executive functions underlying self-regulation, providing interaction settings that foster the transition from other- to self-regulation, and creating classroom practices that are conducive to self-regulation development.

Executive function training

Programs have been developed to foster executive functions in at risk preschool children with poor working memory or executive functions or attention deficit hyperactivity disorder (ADHD). Research shows sizeable effects of computerized training on executive functions if the difficulty level, or "working memory load," is adaptively increased, on nonverbal intelligence and on parent reports of self-regulation behaviour in children with ADHD, but evidence for transfer to academic achievement and classroom behaviour is not fully consistent.[18]

Settings that foster self-regulation

In the Vygotskian approach, early development of self-regulation is related to peer interaction in pretend play.[19,20] Pretend play requires children to establish a shared imagined world. They negotiate what to do, coordinate their roles and reconcile differing motives, decide on the global plan, while updating the plan as the play evolves. In more mature pretend play, children frequently switch between in-play talk and meta-play talk to coordinate their behaviours, showing metacognitive regulation. Sociodramatic play is a variant of pretend play in which children become part of the symbolized order and change their identities as they take up roles. Sociodramatic play requires imagining others' state of mind and allows trying-out emotions and appears to be related to emotional self-regulation.[21]

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Using knowledge about learning and monitoring the process of learning in order to self-regulate learning behaviour occurs already with three- to five-year-olds, especially in situations allowing children choice and control of the level of challenge.[22] Analysis of videotaped interactions revealed several factors promoting metacognitive self-regulation. More metacognitive self-regulation occurred when children worked in small groups on tasks requiring a plan. Involvement of the teacher increased metacognitive self-regulation. In unsupervised small group activities, children showed high levels of shared metacognitive and meta-emotional regulation, using emotion knowledge. In solitary activities, enhanced emotional self-regulation –to stay motivated and persistent– was observed. Making preschool teachers aware of metacognitive strategies in the planning, execution and evaluation phases of learning activities influenced preschoolers' metacognitive knowledge of how to approach learning tasks, how to regulate the learning process and how to evaluate outcomes.[23]

Classroom practices

High preschool classroom quality promotes a range of child outcomes, cognitive as well as social and behavioural,[24] and the development of executive functions and self-regulation appears to be an important mediating link.[25] A randomized controlled experiment[26] studied the joint effects of the Program for Alternative Thinking Strategies (PATHS) and an interactive storybook reading intervention added to a regular Head Start curriculum. PATHS is intended to increase emotional self-regulation, social problem solving skill and social competence. The main components are: 1) establishing emotionally positive classroom rules and routines; 2) lessons in self-soothing, self-rewarding, cooling-down and social conflict solving; 3) teacher modeling of helping and sharing behaviour, turn-taking and emotional coaching; and 4) storybook reading focusing on dialogue and the use of open-ended questions and complex language. The intervention increased executive functioning in task behaviour and academic knowledge.

The Tools of the Mind (Tools) program[27] stands in the Vygotskian tradition. It is intended to promote academic skills for preschoolers from disadvantaged backgrounds, and uses instruction and interaction formats that support transition from other to self-regulation. The main components are 1) teacher-guided learning and problem-solving in small groups in which children are stimulated to verbalize their plans and evaluate the problem solving, 2) peer collaboration in play and problem-solving, with children alternating the role of tutor, 3) the use of memory aids symbolizing social rules, such as attentive listening and waiting for one's turn; and 4) sociodramatic play to promote emotional self-regulation. A study with random assignment

of 5-year-olds to either Tools or an academic-focus program, found Tools superior both in academic outcomes and in executive functions.[28]

The importance of allowing children initiative and control over activities is supported by findings on Montessori kindergartens, whose curriculum had an emphasis on student-chosen work and a mix of individual and small group instruction in academic and social skills. Children attended multi-age classrooms and classroom rules induced children to wait for their turn and to be considerate towards younger children. Due to a waiting list, three-year-olds, mostly minority children, were randomly assigned to Montessori or other preschools. At age 5, Montessori children outperformed controls in academic skills, executive functions, social competence, moral reasoning and creative skills.[29]

Conclusion

Early childhood education programs can help develop learning-related skills, in particular self-regulation and executive functions. Instructional activities with academic content can promote self-regulation by encouraging children to verbalize plans and evaluate their performance, with self-talk functioning as a bridge between external and self-regulation. Modeling metacognition and self-regulation by the teacher, providing memory aids and stimulating the use of private speech can support the transition from other- to self-regulation.

Allowing children choice and control of the level of challenge stimulates metacognitive awareness and metacognitive self-regulation. The use of collaborative play and problem solving activities, pretend play and sociodramatic play promote self-regulation in young children. Existing programs can benefit from rules and routines that improve the social-emotional classroom climate. Training teachers to become more sensitive to children’s needs, to avoid negativity and to establish secure social relationships with children is also important. Explicitly addressing emotions, using stories with emotional content, providing emotion knowledge and demonstrating emotional self-regulation, improves emotional self-regulation.

To conclude, the issue is not abandoning academic content that includes rich vocabulary, world knowledge, insights in physical phenomena and in human mental and emotional life. The issue is mostly about pedagogical approaches, the ways of conduct in the classroom, the quality of the social relationships, children’s choice of activities, the forms of interaction for children, and features and activities, such as pretend play, that specifically support memory, executive

function and self-regulation development.[30]

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