



LES FONCTIONS EXÉCUTIVES ET LEURS IMPLICATIONS DANS LES APPRENTISSAGES SCOLAIRES

SERVICE ORTHOPHONIQUE

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PLAN

- Les fonctions exécutives?
 - La flexibilité
 - L'inhibition
 - La mémoire de travail
 - La planification
- Implication des fonctions exécutives dans les apprentissages scolaires
- Stimuler les fonctions exécutives au quotidien

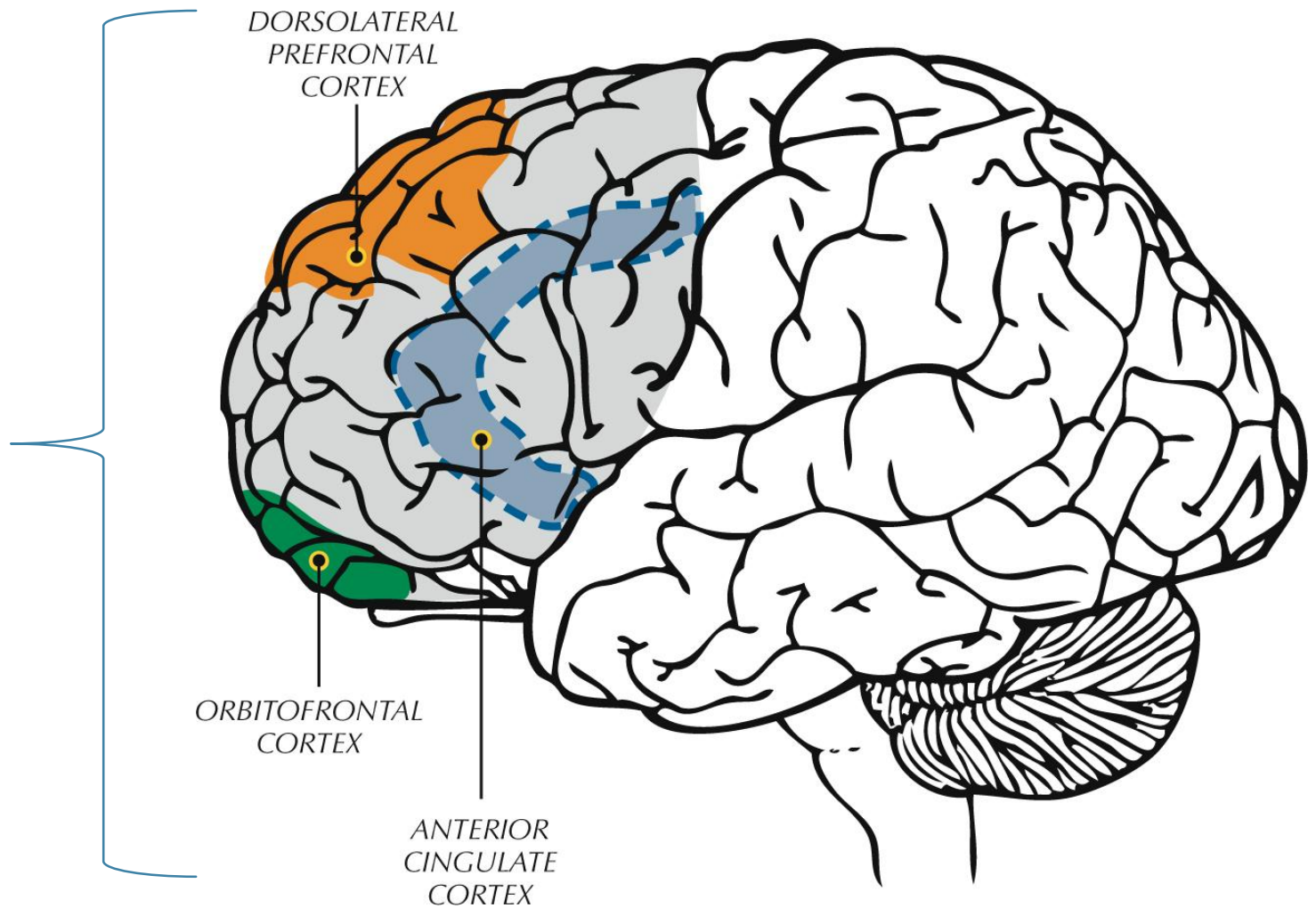
LES FONCTIONS EXÉCUTIVES:

- « La cognition regroupe l'ensemble des processus mentaux par lesquels un organisme acquiert des informations sur son environnement et les traite pour ajuster son comportement», (François Bresson).
- Le système cognitif est donc un système complexe qui regroupe :
 - Les processus de traitement de l'information dits de « haut niveau » tels que le raisonnement, la mémoire, la prise de décision et les fonctions exécutives
 - Des processus plus élémentaires de « bas niveau » que sont la perception, la motricité ainsi que les émotions.

LES FONCTIONS EXÉCUTIVES

- Pour définir, les fonctions exécutives sont «des fonctions cognitives qui ont un rôle important dans la résolution de problème » ou plus spécifiquement c'est « un ensemble d'habiletés cognitives de haut niveau nécessaires à la réalisation d'un comportement dirigé vers un but » (Luria, 1966).
- C'est donc « l'ensemble des processus dont la fonction principale est de faciliter l'adaptation du sujet à des situations nouvelles, notamment lorsque les routines d'actions, c'est-à-dire des habiletés cognitives sur-apprises, ne peuvent suffire. »(Seron, Van der Linden et Andres, 1999)
- Elles impliquent la coordination des actions et des pensées finalisées vers un but.

Les fonctions exécutives sont principalement associées au fonctionnement des lobes frontaux du cerveau, spécifiquement le lobe préfrontal.



LES FONCTIONS EXÉCUTIVES

Développement
et changements
neuro-
anatomiques

Augmentation des
réseaux
neuronaux et du
volume cérébral
(notamment lobe
préfrontal)

Capacités
croissante de
contrôle de la
pensée et des
actions

A partir de
l'âge de 1 an

LES FONCTIONS EXÉCUTIVES (VIDEO):

LES FONCTIONS EXECUTIVES:

Cool
executive
functions

Hot
executive
functions

Flexibilité

Mémoire de
travail

Planification

Inhibition

Autorégulation du
comportement

Prise de décision
affective

Cognition sociale

LES FONCTIONS EXÉCUTIVES:

Flexibilité (shifting)

Capacité à changer de point de vue, à modifier sa stratégie et à en générer de nouvelles pour s'adapter à de nouvelles situations
Shifting simple a l'âge préscolaire
Tâches complexes entre 7 - 9 ans

Planification

Capacité d'élaborer un plan réfléchi et séquencé afin de parvenir a un but ultérieurement
Planification simple chez les enfants dès l'âge de 3 ans
Développement entre les âges de 5-8
Comportement stratégique, raisonnement et planification plus organisée et efficace entre 7-11 ans,
Les améliorations se poursuivent jusqu'au début de l'âge adulte.

Inhibition

Capacité à résister aux automatismes ou aux distractions
Performance réussie des l'âge de 4 ans
Complète entre l'âge de 10 ans - 12 ans

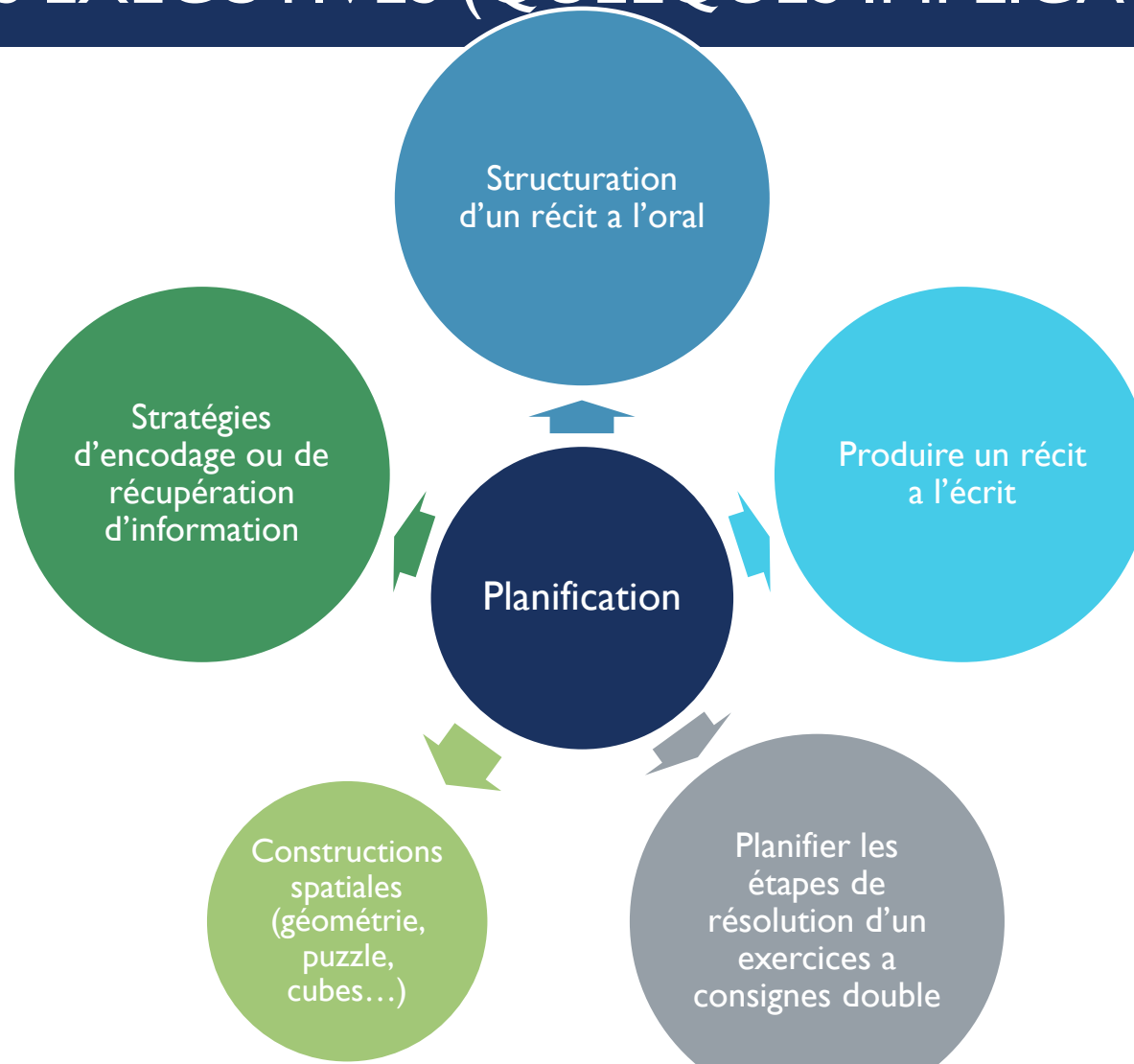
Mémoire de travail (mise a jour)

Processus permettant de stocker en mémoire à court terme des informations sensorielles, et de pouvoir les manipuler en rapport avec le but déterminé (manipulation cognitive)
Augmentation linéaire entre 4 et 14 ans et stabilisation entre 14 et 15 ans

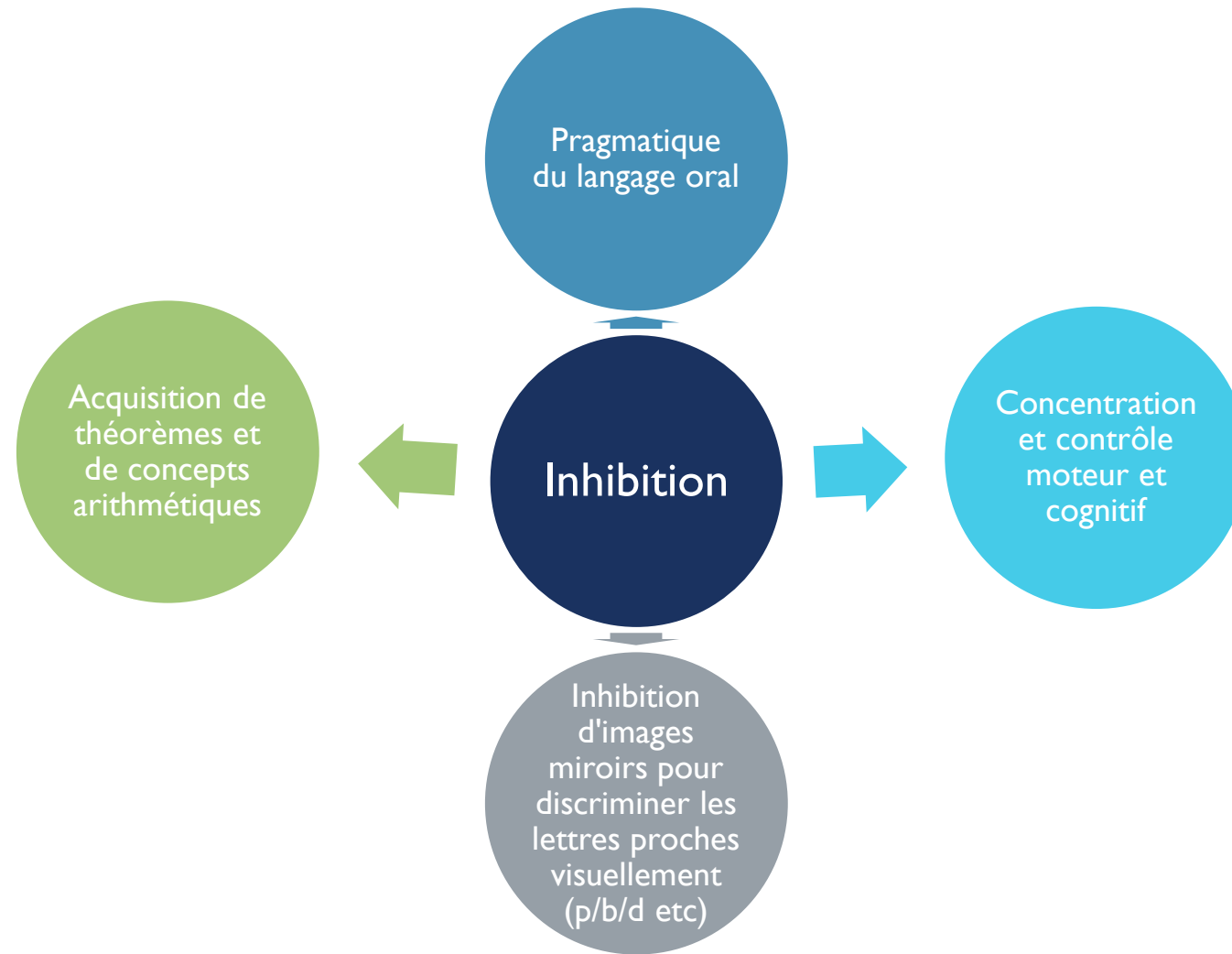
LES FONCTIONS EXÉCUTIVES:

- Quels sont les implications de ces fonctions dans les apprentissages scolaires?
- Les FE jouent un rôle primordial dans les apprentissages scolaires mais de façon différente et propre à chaque apprentissage (Lanoë, 2014).
- Un déficit au niveau des FE notamment la mise à jour en mémoire de travail est lié aux troubles du langage et ainsi un déficit dans la totalité des FE est en lien avec les troubles d'apprentissage du calcul (neuroeducation journal, 2018).

LES FONCTIONS EXÉCUTIVES (QUELQUES IMPLICATIONS):



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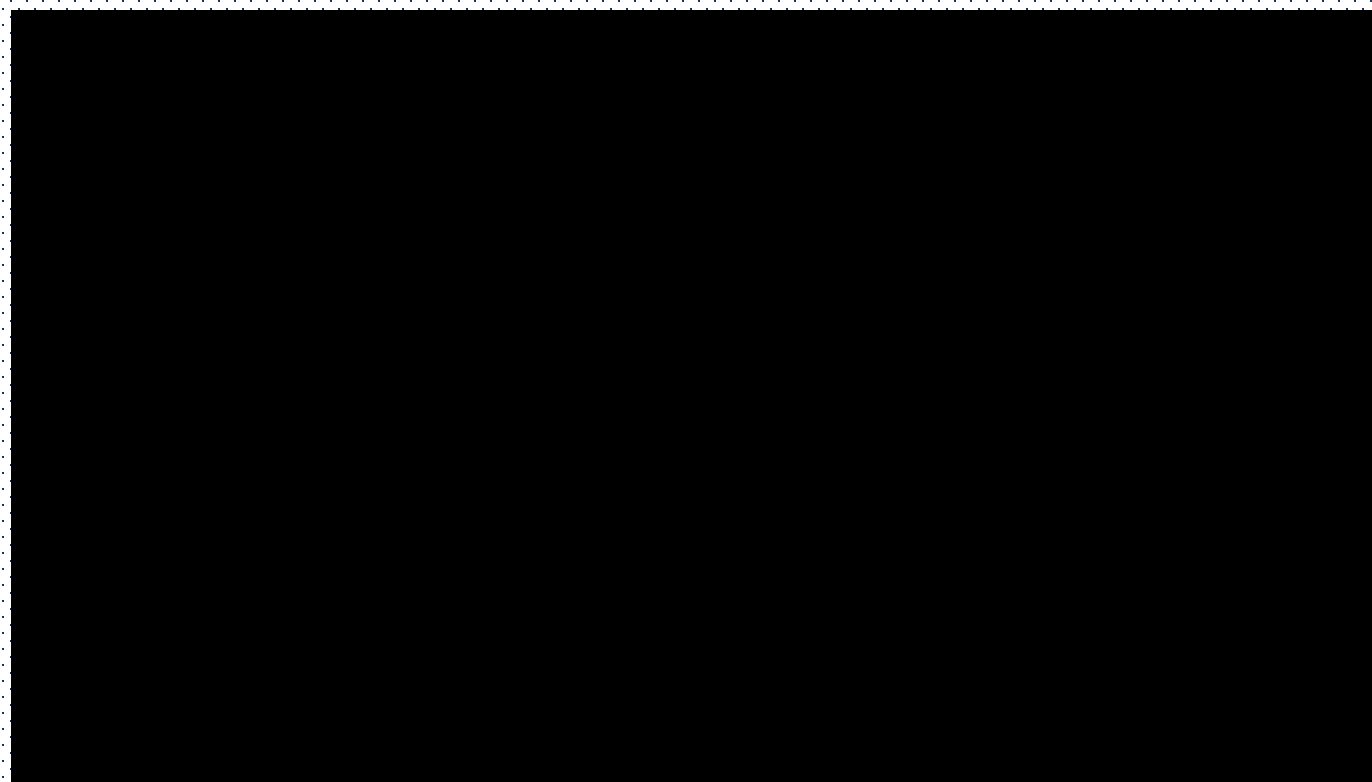
LES FONCTIONS EXÉCUTIVES (QUELQUES IMPLICATIONS):



LES FONCTIONS EXÉCUTIVES (QUELQUES IMPLICATIONS):



LES FONCTIONS EXÉCUTIVES (VIDEO)



LES FONCTIONS EXECUTIVES (JEUX POUR STIMULER LES FE):

Executive Function Activities for 3- to 5-year-olds

Children's executive function and self-regulation skills grow at a fast pace during this period, so it is important to adapt activities to match the skills of each child. Younger children need a lot of support in learning rules and structures, while older children can be more independent. Ultimately, the goal is to shift children away from relying on adult regulation, so when the child seems ready to try to reduce the support you provide.

Imaginary play

During intentional imaginary play, children develop rules to guide their actions in playing roles. They also hold complex ideas in mind and shape their actions to follow these rules, inhibiting impulses or actions that don't fit the "role." Players often take ideas from their own lives, such as going to the doctor's office. The might act "sick," be examined by the doctor, and receive a shot. The "doctor" talks and act like a doctor (calm and reassuring), the "sick child" talks and acts like a sick child (sad and scared), and the child in the role of "parent" talks and acts like a concerned parent (worried and caring). While younger children tend to play alone or in parallel, children in this age range are learning to play cooperatively and often regulate each other's behavior—an important step in developing self-regulation.

Ways to support high-level imaginary play:

- **Read books, go on field trips, and use video** to make sure that children know enough about the scenario and roles to support pretend play
- **Provide a varied set of props and toys** to encourage this type of play. Younger preschoolers may need more realistic props to get the play started (e.g., toy medical kits), while

Storytelling

Children love to tell stories. Their early stories tend to be a series of events, each one related to the one before, but lacking any larger structure. With practice, children develop more complex and organized plots. As the complexity of the storytelling grows, children practice holding an manipulating information in working memory.

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Executive Function Activities for 5- to 7-year-olds

Games can exercise children's executive function and self-regulation skills—and allow them to practice these skills—in different ways. At this age, children start to enjoy games that have rules, but do so with widely varying levels of interest and skill. Since an important aspect of developing these skills is having a constant challenge, it's important to choose games that are demanding but not too hard for each child. As the child players become familiar with these games, try to decrease the adult role as soon as possible; the challenge is greater for children if they remember and enforce the rules independently. Just be prepared with some techniques for negotiating conflict. Flipping a coin or drawing a straw are some methods used by Tools of the Mind, an early education program designed to build self-regulation.



Card games and board games

■ **Games that require players to remember** the location of particular cards are great at exercising working memory. At the simplest level, there are games such as *Concentration*, in which children uncover cards and have to remember the location of matches. At a more complicated level are games that require tracking types of playing cards as well as remembering their locations, including *Go Fish*, *Old Maid*, *Happy Families*, and *I Doubt It*.

■ **Games in which the child can match** playing cards, either by suit or number, are also good at practicing cognitive flexibility. Examples include *Crazy Eights*, *Uno*, and *Spoons*. *Blink and SET* are newer card games in which cards can be matched on more than two dimensions.

Physical activities/games

■ **Games that require attention and quick responses** help children practice attention and inhibition. They include *freeze dance* (musical statues), *musical chairs*, *Red Light, Green Light*, or *Duck, Duck, Goose* for younger children.

■ **Games that require fast responses and monitoring** are also great for challenging attention and inhibition. *Snap* and *Slapjack* are card games that fall into this category. *Perfection* draws on similar skills.

■ **Any board game that involves some strategy** provides important opportunities to make and hold a plan in mind for several moves ahead, consider the varying rules that govern different pieces, and adjust strategy in response to opponents' moves. Through strategizing, a child's working memory, inhibitory control, and flexibility have to work together to support plan-based, effective play. *Sorry!*, *Battleship*, *Parcheesi*, *mancala*, *checkers*, and *Chinese checkers* are some of the many examples of these types of games for children this age.

who is "It" to mentally track others' movements, challenging working memory as well; these games include *Mother May I?* and *What Time Is It, Mr. Fox?* Others require selective responses and test inhibition, such as the *Magic Word Game*, in which children wait for a "magic

Executive Function Activities for 7- to 12-year-olds

These games provide challenges and practice for executive function and self-regulation skills among school-age children. For children in this age range, it is important to steadily increase the complexity of games and activities.



Card games and board games

■ **Card games in which children have to track** playing cards exercise working memory and promote mental flexibility in the service of planning and strategy. *Hearts*, *spades*, and *bridge* are popular examples.

■ **Games that require monitoring and responses** are great for challenging

■ **Children this age also enjoy more complex** games involving fantasy play, which require holding in working memory complicated information about places visited in imaginary worlds, rules about how characters and materials can be used, and strategy in attaining self-determined goals. *Minecraft* is a popular computer game of this sort, while *Dungeons & Dragons* is a longtime card-based favorite.

Physical activities/games

■ **Organized sports** become very popular for many children during this period. Developing skill in these games practices children's ability to hold complicated rules and strategies in mind, monitor their own and others' actions, make quick decisions and respond flexibly to play. There is also evidence that high levels of physical activity, particularly activity that requires coordination, like soccer, can improve all aspects of executive function.

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Executive Function Activities for Adolescents

During adolescence, executive function skills are not yet at adult levels, but the demands placed on these skills often are. Teenagers need to communicate effectively in multiple contexts, manage their own school and extracurricular assignments, and successfully complete more complex and complicated projects. Here are some suggestions for helping teens practice self-regulation throughout the challenges they face.



Goal setting, planning and organizing

■ **Goal setting, planning and organizing** is necessary in any goal-oriented activity. Identifying goals, planning, organizing, and adjusting behavior are key skills to practice.

■ **To focus the planning process**, encourage teens to identify something specific that they want to accomplish. Most important is that the goals are meaningful to the teen and not established by others. For some teens, planning the college application process may be self-motivating, but for others, planning a social event may be more important. Start with something fairly simple and achievable, such as getting a driver's license or saving money to buy a computer, before moving on to longer-term goals like buying a car or applying to colleges.

■ **Help teens develop plans** for steps to reach these goals. They should identify short- and long-term goals and think about what has to be done to achieve them. For example: If teens want their team to win the sports championship, what skills do they need to learn? How might they practice them? Identify some problems that might arise, and encourage the teen to plan ahead for them.

Tools for self-monitoring

■ **Self-talk is a powerful way** to bring thoughts and actions into consciousness. Examples include having teenagers talk themselves through the steps of a difficult activity or periodically pausing for a mental play-by-play narrative.

■ **Taking on large social issues**, such as homelessness, domestic violence, or bullying can be both appealing and overwhelming to teens. *DoSomething.org* and *Volunteer-Match.org* can help identify concrete actions.

■ **Remind adolescents to periodically monitor their behavior** and consider whether they are doing the things they planned and whether these plans are achieving the goals they identified. "Is this part of the plan? If not, why am I doing it? Has something changed?" Monitoring in this way can identify counter-productive habitual and impulsive actions and maintain focused attention and conscious control.

arise that provoke strong negative emotions or feelings of failure, self-talk can help adolescents identify potentially problematic thinking and behavior patterns.

■ **Encourage self-talk that focuses on growth.** Help teens recognize that an experience—par-

« Double clique » sur chaque document pour ouvrir

LES FONCTIONS EXÉCUTIVES :

Pour plus d'information et plus d'idées concernant la stimulation des FE au quotidien, n'hésitez pas à contacter le service orthophonique sur l'adresse mail :

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TELL ME AND I FORGET

**TEACH ME AND I
REMEMBER**

**INVOLVE ME AND I
LEARN**

Benjamin Franklin