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# SELF-REGULATORY/EXECUTIVE FUNCTION ISSUES

## Tutorial: Problem Solving

(See also Tutorials on [Self-Regulation and Executive Function Routines](#), [Self-Awareness](#), [Sense of Self](#), [Goal Setting](#), [Self-Monitoring](#), [Organization](#))

### WHAT IS PROBLEM SOLVING?

Problems in everyday life are best understood as obstacles to goals. That is, the individual wants to achieve an outcome, but something stands in the way. Therefore, thought must be given to a strategy, tactic, or activity that overcomes the obstacle. That activity is the solution to the problem. Problems can be major – associated with long-term and substantial goals (e.g., an 18 year old student wants to go to college but lacks the credits for high school graduation). Alternatively, they can be minor, requiring only small problem-solving activities (e.g., the student’s pencil is too dull to write legibly). Some problems are solved consciously and deliberately, whereas others are solved automatically with minimal thought. For many individuals, the process of setting goals, planning, reviewing, and adjusting (solving problems) is often relatively automatic.

Problem solving can be understood as an act of cognition separate from other cognitive and self-regulatory acts. Alternatively – and more accurately – it can be understood within the more general context of self-regulation. Individuals who are successful in life tend to know what they need and want, set goals for themselves, make plans to achieve the goals, act in a goal-directed manner (initiating relevant behaviors and inhibiting distracting behaviors), pay attention to their successes and failures in achieving goals, and make adjustments (i.e., solve problems) when goals are not achieved or difficult to achieve. Thus problem solving is a critical component of self-regulation or executive functioning and should be understood within this context. (See [Self-Regulation/ Executive Function Routines](#).)

Problem solving is closely tied to self-awareness of strengths and weaknesses. (See [Self-Awareness](#).) When students are not aware of difficulties in a specific area of functioning – or actively resist acknowledging such difficulties – they are less likely to effectively monitor their performance in that area and engage in successful problem solving when problems emerge. When students resist problem-solving strategies and systems, or fail to develop habits of problem solving, it is often because of either weak awareness of or resistance to acknowledge their difficulties.

### WHY IS PROBLEM SOLVING IMPORTANT FOR MANY STUDENTS AFTER TBI?

For many people, the process of setting goals, planning, reviewing, and adjusting (solving problems) is often relatively automatic. For many students with disability, including disability associated with TBI, this process is not automatic. Problem solving may need to become more conscious and deliberate. In part, this is because there are more obstacles to overcome and problems to be solved if one has a disability. Furthermore, this process of setting and managing goals and solving problems in pursuit of goals may be a relatively specific deficit after the brain injury. Individuals with damage in the frontal regions of the brain, common after TBI, tend to have difficulty understanding their needs, setting realistic goals, making plans to achieve the goals, initiating relevant goal-directed behaviors, inhibiting distracting behaviors, monitoring their performance, evaluating outcomes in relation to goals, and making strategic adjustments – that is, solving problems – as a result of this monitoring process. Therefore, goal management and problem solving are often specific intervention targets in working with students with TBI.

As stated above, it is unlikely that strategies and systems of problem solving will be accepted and used in the absence of students' awareness of their difficulties. As a result of damage to the frontal lobes, many students with TBI are relatively unaware of their difficulties. Alternatively, they may resist that awareness because it is emotionally painful. In either case, the students will likely resist problem-solving strategies and systems until awareness and denial are effectively addressed. (See Tutorial on Self-Awareness.)

## **WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WITH TBI WHO HAVE DIFFICULTY SOLVING PROBLEMS?**

**Understanding the Problem:** As always, step one in helping students with complex disability is understanding the problem. For example, difficulty with problem solving could be a direct consequence of the injury, a normal phase of development in young children, an emotional response to disability after the injury, a control issue, or other behavioral problem. The problem exploration steps on this web site should help staff and family identify the factors associated with the student's difficulty with problem solving.

**Developmental Appropriateness of the Student's Problem-Solving Abilities:** The ability to solve problems develops gradually over the childhood and adolescent years. Preschoolers might be expected to solve simple physical problems (e.g., "Cutting with a scissors is hard; can you help me?"), but not cognitive, academic, or emotional problems. By the late preschool years, children should be able to solve simple cognitive and self-regulation problems (e.g., "Put it in my back pack so I remember to take it to school. Put the cookies away so I don't take any until after lunch"). In addition to physical goals, elementary-age students can be expected to solve some cognitive and academic problems with help (e.g., "I have trouble remembering what parts go into a story; it helps if you show me a picture of all the parts that I should include. I can't finish all these problems before lunch; can you help me or can I have some time after lunch?"). Middle school and high school students can be expected to solve cognitive and academic problems more independently (e.g., "I need to turn the radio off when I study; I'll begin my paper by writing ideas on 3X5 cards").

Older elementary students and middle/high school students can be expected to participate in developing the plans and strategies on their Individualized Education Plan. This participation might be highly supported. For example, the student might be presented with a set of possibilities to choose from. Older and more mature students can engage in this process with systematically increasing independence.

Students who experience their TBI at a younger age often exhibit developmental lags in their problem-solving abilities as they age (i.e., exhibit problem-solving skills expected an earlier developmental stage). Students who experience their TBI during adolescence may exhibit arrested growth of problem solving abilities after their TBI.

**Systematic Transfer of Control from Adult to Student:** From the preschool years through late adolescence, there are many steps and stages in the development of problem solving and other self-regulatory functions. Corresponding to these many steps should be a systematic transfer of responsibility to the student for problem solving and other aspects of self-regulation. For example, it is expecting too much of a preschooler to ask for independent problem solving; similarly it is asking too little of adolescents for adults to continue solving all or most of their problems for them. Shift in responsibility should be systematic, grounded in an observation-based judgment of how much responsibility the student can accept – but always moving to higher levels of independence for the student and lower levels of support from adults. Students with TBI may require more help in problem solving, resulting in a slower rate of this shift of responsibility from adult to student.

### **General Self-Regulation Script/Routine: Goal-Obstacle-Plan-Do-Review**

As stated above, problem solving is ideally understood within the context of more general self-regulation. What follows is an outline of how people achieve success when tasks are difficult. One of the goals of education is to plant this template into the heads of all students. This becomes even more essential for

students with TBI, because they more frequently face difficult tasks than students with no disability. Problem identification and problem solving arise at the level of identifying obstacles and creating plans, but also at the level of review and adjustment. Ideally this GOPDR script will become a habit for adults in the student's life, thereby increasing the likelihood that it becomes a habit of thinking for the student with TBI. (See [Tutorial on Self-Regulation/Executive Function Routines](#))

**GOAL:** What's the goal? what are you trying to achieve? what do you want to have happen? what's it going to look like when you're done?

**OBSTACLE:** What is standing in the way of you achieving the goal? What is the problem?

**PLAN:** So what's the plan? what do you need to do? you need help? want to do it as a team? think that plan will work??

**PREDICTION:** So how well do you think you will do? How many can you get done? On a scale of 1 to 10, how well will you do?

**DO:** Apply the chosen solution.

**REVIEW:** So how'd it work out? what worked? anything that didn't work? why not? what are you going to try next time? How might you do it better?

Self-Regulatory Scripts: See [Self-Regulation/Executive Function Routines](#) for a variety of self-regulation scripts/routines that are relevant for students with problem-solving difficulty. Of special relevance is the Problem-Solving Script. This can be understood as an elaboration of the Obstacle, Plan, and Review stages of the GOPDR routine. The "hard/easy" script, "big deal/little deal" script, "ready/not ready" script, and others can also be seen as directly relevant to success in problem solving.

### **Problem-Solving/Strategic Behavior Script**

Importance: Students with TBI need to be more strategic (better problem solvers) than students with no disability because they face more problems/difficulties in their lives. Often they receive little practice in strategic thinking/problem solving because family and staff do their strategic thinking/problem solving for them. Students with TBI should be provided as much practice in problem solving as possible. A problem-solving script can be seen as an elaboration of the GOPDR script described above. Elaboration at the Obstacle stage may include stating a reason for the problem. Elaboration at the Plan stage may include brainstorming and generating a variety of possible solutions (strategies, plans) and evaluating the possibilities. Elaboration at the Review stage may include considering a variety of possible adjustments if the implemented solution (plan) was not adequately successful. With whatever support may be needed, these problem-solving scripts should be practiced throughout the day in all everyday settings.

### **Participation in Problem-Solving Activities: Academic Settings**

As mentioned above, older elementary students and middle/high school students can be expected to participate in developing their goals and plans (i.e., solutions to problems) on their Individualized Education Plan and monitoring progress toward these goals. However, to develop a habit of problem solving, students should be encouraged to participate in real-world problem solving in the context of everyday activities.

Older elementary school students can have taped to their desk top (and covered by plastic) a checklist that includes: Assignment:.....; Date Due:.....; Plan: .....; Started:.....; Finished and Checked:.....; Turned In: .... ; Grade..... What worked? .... What didn't work?.... What will I do differently next time?.... Middle and high school students can have similar checklists on paper placed in their school binder. Problem solving is embedded in the section for Plan and sections for Grade, What Worked? What Didn't Work? and What Will I Do Differently? Whether or not there are written checklists of this sort, teachers should ensure that their

students are routinely asking themselves these questions, paying attention to their outcomes, reflecting on what works for them and what does not work, and brainstorming about new plans (i.e., possible solutions). A habit of problem solving will be formed only if students routinely monitor their work, initially with teacher and family encouragement, and participate in solving problems. In the case of large assignments – for example, major projects in high school – teachers should help students break the large project into smaller parts, and monitor their work on each part.

Students' reflection on what they might do differently to succeed can be facilitated with a checklist of common strategies (i.e., solutions to problems):

\_\_\_: Start working early

\_\_\_: Ask for help

\_\_\_: Break large tasks into small tasks

\_\_\_: Have somebody check work along the way

\_\_\_: Devote specific times every day at home to homework

\_\_\_: Have a special quiet place at home where homework is done

\_\_\_: Check math work with a calculator

\_\_\_: Use a spell checker and grammar checker for written assignments

### **Participation in Problem-Solving Activities: Social, Emotional, and Behavioral Functioning**

Similar problem-solving activities can be encouraged in social, emotional, and behavioral domains.

To heighten self-understanding, students can be asked to list situations that cause stress or problem behaviors (e.g., performance demands; multiple assignments; conflict with friends; conflicts at home; specific school or work tasks; poor grades). Students should also list their known reactions to stress (e.g., increased heart rate; perspiration; rapid breathing; trembling hands; feeling of illness, headache, or fatigue; feeling of anxiety, fear, anger, irritability; inability to concentrate or remember; aggressive thoughts or actions; self-critical thoughts or actions; social withdrawal).

Third, students should list useful strategies (i.e., solutions) to use when feeling stress or other negative emotions (e.g., ask for help; talk to family or friends about the problem; create a plan to deal with the problem and act on it; engage in fun, relaxing activities; exercise; reduce demands; view the problem as a challenge to be resolved; try to find something positive or funny about the situation).

With the help of a teacher or counselor, the student can then periodically describe difficult emotions or behaviors that have occurred, their reactions, their behaviors and strategies, the outcome, and alternative strategies for the future.

Written by Mark Ylvisaker, Ph.D. with the assistance of Mary Hibbard, Ph.D. and Timothy Feeney, Ph.D.

## Tutorial: Self-Monitoring and Self-Evaluating

(See also Tutorials on Self-awareness, Sense of Self, Self-Regulation Routines, Organization)

### WHAT IS SELF-MONITORING?

Self-monitoring is the process of observing one's behavior and evaluating it in relation to goals. Self-monitoring can be conscious and deliberate (e.g., a student double checks problems on a math test to ensure accuracy); alternatively it can be subconscious and automatic (e.g., a student subconsciously notices whether or not others are paying attention to him in conversation).

Self-monitoring can be understood as an act of cognition separate from other cognitive and self-regulatory acts. Alternatively – and more accurately – it can be understood within the more general context of self-regulation. Individuals who are successful in life tend to know what they need and want, set goals for themselves, make plans to achieve the goals, act in a goal-directed manner (i.e., initiating relevant behaviors and inhibiting distracting behaviors), pay attention to their success in achieving goals (i.e., self-monitoring), and make adjustments when goals are not achieved. Thus self-monitoring is a critical component of self-regulation or executive functioning and should be understood within this context. **(See Self-Regulation/Executive Function Routines.)**

Self-monitoring tends to develop in steps from (1) minimal understanding of what is easy and what is difficult, to (2) increasing understanding that some activities/functions are easy and some are difficult, to (3) recognition that a mistake has been made after it is made, to (4) anticipating difficult activities and doing something in advance to succeed. Thus self-monitoring is closely tied to self-awareness of strengths and weaknesses. **(See Self-Awareness.)** When students are not aware of difficulties in a specific domain of functioning – or actively resist acknowledging such difficulties – they are unlikely to effectively monitor their performance in that domain. When students resist self-monitoring systems or fail to develop habits of self-monitoring, it is often because of either weak awareness of or resistance to acknowledging their difficulties.

### WHY IS SELF-MONITORING IMPORTANT FOR MANY STUDENTS AFTER TBI?

For many people, the process of setting goals, planning, monitoring/reviewing, and adjusting is often relatively automatic. For many students with disability, including disability associated with TBI, this process is not automatic. It may be more conscious and deliberate because there are more obstacles to overcome and goals to achieve. Or the process may be resisted because of the negative associations with disability. Furthermore, this process of managing goals and self-monitoring may be a relatively specific deficit. Individuals with damage in the frontal regions of the brain, common after TBI, tend to have difficulty understanding their needs, setting realistic goals, making plans to achieve the goals, initiating relevant goal-directed behaviors, inhibiting distracting behaviors, monitoring their performance, evaluating the outcomes in relation to goals, and making strategic adjustments as a result of this monitoring process. Therefore, goal management and self-monitoring are often specific intervention targets in working with students with TBI.

As stated above, it is unlikely that strategies and systems of self-monitoring will be accepted and used in the absence of the students' awareness of their difficulties. As a result of damage to the frontal lobes, many students with TBI are relatively unaware of their difficulties. Alternatively, they may resist that awareness because it is emotionally painful. In either case, the students will likely resist self-monitoring systems until awareness and resistance are effectively addressed. **(See Self-Awareness.)**

## WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHO HAVE DIFFICULTY WITH SELF-MONITORING?

**Understanding the Problem:** As always, step one in helping students with complex disability is understanding the problem. For example, difficulty self-monitoring could be a direct consequence of the injury, a normal developmental difficulty for young children, a product of normal adolescent bravado, an emotional response to disability after the injury, a control issue, or other behavioral problem. The problem-solving steps on this web site should help staff and family identify the factors associated with the student's difficulty with self-monitoring.

**Developmental Appropriateness:** The ability to self-monitor develops gradually over the childhood and adolescent years. Preschoolers might be expected to self-monitor physical activities (e.g., "I didn't pick up all of my toys; I made it only half way on the balance beam without falling"), but not cognitive, academic, or emotional activities. By the late preschool years, children should be able to monitor some simple self-regulation activities (e.g., "I couldn't wait for my cookie until after lunch"). In addition to physical goals, elementary-age students can be expected to monitor some cognitive and academic activities with help (e.g., "Write down how many problems you finish before lunch. Be sure to check your work. Keep track of how many pages you read."). Middle school and high school students can be expected to monitor cognitive and academic activities more independently (e.g., "I can pay attention to the whole class in science, but I lose my focus in English after a few minutes; I study more effectively without the radio on; I use an editing cheat sheet when I edit my essays"). Furthermore, they can be expected to anticipate problems on specific occasions and act strategically in light of this anticipation (e.g., "It's noisy in this room so I'd better go to a quieter room so I can concentrate").

Older elementary students and middle/high school students can be expected to participate in developing the goals on their Individualized Education Plan (i.e., long-term goals) and in monitoring progress toward these goals. This participation might be highly supported. For example, the student might be presented with a checklist of functioning areas with which to identify (with help if necessary) areas of strength and need. With help, the student may then formulate statements of "current levels of functioning" and update those statements every year or half year. Older and more mature students can engage in this process with systematically increasing independence.

Students who experience their TBI at a younger age often exhibit developmental lags in their self-monitoring abilities as they age (i.e., exhibit self-monitoring skills expected an earlier developmental stage). Students who experience their TBI during adolescence may exhibit arrested growth of self-monitoring abilities after their TBI.

**Systematic Transfer of Control from Adult to Student:** From the preschool years through late adolescence, there are many steps and stages in the development of self-monitoring and other self-regulatory functions. Corresponding to these many steps should be a systematic transfer of responsibility to the student for self-monitoring and other aspects of self-regulation. It is expecting too much of a preschooler to ask for independent self-monitoring; similarly it is asking too little of an adolescent for adults to continue monitoring their performance for them and modifying their goals. Shift in responsibility should be systematic, based on an observation-based judgment of how much responsibility the student can accept – but always moving to higher levels of independence for the student and lower levels of support from adults. Students with TBI may require more help in self-monitoring, resulting in a slower rate of this shift of responsibility from adult to student.

**General Self-Regulation Script/Routine: Goal-Obstacle-Plan-Do-Review**

As stated above, self-monitoring is ideally understood within the context of more general self-regulation. What follows is an outline of how people achieve success when tasks are difficult (consciously or subconsciously). Self monitoring can take place in the discussion of obstacles or during the review stage. One of the goals of education is to plant this template into the heads of the students – particularly those with disability, because they more frequently face difficult tasks than students with no disability. Ideally this



GOPDR script will become a habit for adults in the student's life, thereby increasing the likelihood that it becomes a habit of thinking for the student. (See **Self-Regulation/Executive Function Routines**)

GOAL: What's the goal? what are you trying to achieve? what do you want to have happen? what's it going to look like when you're done?

OBSTACLE: What is standing in the way of you achieving the goal? What is the problem?

PLAN: So what's the plan? what do you need to do? you need help? want to do it as a team? think that plan will work??

PREDICTION: So how well do you think you will do? how many can you get done? on a scale of 1 to 10, how well will you do?

DO: [Perhaps solving problems along the way or revising the plan]

REVIEW: So how'd it work out? what worked? anything that didn't work? why not? what are you going to try next time? How might you do it better?

Self-Regulatory Scripts: See **Self-Regulation/Executive Function Routines** for a variety of self-regulation scripts/routines that are relevant for individuals with self-monitoring difficulty. Of special relevance is the "hard/easy" script. This can be understood as an elaboration of the Obstacle stage of the GOPDR routine. The "big deal/little deal" script, "ready/not ready" script, and others can also be seen as directly relevant to success in self-monitoring.

### **Hard To Do/Easy To Do Script**

Importance: This is a critically important concept for people with disability – because it is necessary to know that something is difficult to do if one is going to work hard or be strategic to get it done. People with disability need to work hard and be strategic to get things done. Therefore, it is critical for them to be able to identify what is hard to do versus what is easy to do. Furthermore, even if students possess strategies to enhance their performance, they will not use the strategies unless they anticipate difficult tasks.

#### **Script:**

1. Identify/label the issue (e.g., "This is kind of hard to do, isn't it?" – or medium hard or pretty easy)
2. State the reason (e.g., "It's hard/easy to do because...")
3. Offer a strategy (e.g., "Maybe you should ask for help? Or ...." Or "It's easy because you did ...")
4. General reassurance (e.g., "Great; that was kind of hard to do – but you asked for help (or other strategy) and we did it. There's always something that works, isn't there?")

Gradually reduce external support as it becomes possible to do so. Because many students are anxious and acutely aware of some of their difficulties, it is important that most of these interactions highlight what is easy for them – and the "hard to do" scripts remain positive in the sense that the focus is on the strategy and success, not on the inability.

### **Participation in Self-Monitoring/Record Keeping Activities: Academics**

As mentioned above, older elementary students and middle/high school students can be expected to participate in developing the goals on their Individualized Education Plan (i.e., long-term goals) and monitoring progress toward these goals. However, to develop a habit of self-monitoring, students should be encouraged to monitor progress on short-term goals and everyday activities.

Older elementary school students can have taped to their desk top (and covered by plastic) a checklist that includes: Assignment:.....; Date Due:.....; Started:.....; Strategies Used: .....; Finished and Checked:.....; Turned In: .... Grade: .... What Worked? .... What Didn't Work? .... and What Will I Do Differently ..... Middle and high school students can have similar checklists on paper placed in their school binder. Whether or not there are written checklists of this sort, teachers should ensure that their students are routinely asking themselves these questions, paying attention to their outcomes, and reflecting on what works for them and what does not work. A habit of self-monitoring will be formed only if students routinely monitor their work, initially with teacher encouragement. In the case of large assignments – for example, major projects in high school – teachers should help students break the large project into smaller parts, and monitor their work on each part.

Students' reflection on what they might do differently to succeed can be facilitated with a checklist of common strategies:

\_\_\_: Start working early

\_\_\_: Ask for help (from teachers or parents)

\_\_\_: Work collaboratively with peers (if allowed)

\_\_\_: Break large tasks into small tasks

\_\_\_: Have somebody check work along the way

\_\_\_: Devote specific times every day at home to homework

\_\_\_: Have a special quiet place at home where homework is done

\_\_\_: Check math work with a calculator

\_\_\_: Use a spell checker and grammar checker for written assignments

\_\_\_: Promise self a reward when finished

### **Participation in Self-Monitoring/Record Keeping Activities: Social, Emotional, and Behavioral Functioning**

Similar self-monitoring activities can be encouraged in social, emotional, and behavioral domains. To heighten self-understanding, students can be asked to list situations that cause stress or problem behaviors (e.g., performance demands; multiple assignments; conflicts with friends; conflicts at home; specific school or work tasks; poor grades). Students should also list their known reactions to stress (e.g., increased heart rate; perspiration; rapid breathing; trembling hands; feeling of illness, headache, or fatigue; feeling of anxiety, fear, anger, irritability; inability to concentrate or remember; aggressive thoughts or actions; self-critical thoughts or actions; social withdrawal).

Third, students should list useful strategies to use when feeling stress or other negative emotions (e.g., ask for help; talk to family or friends about the problem; create a plan to deal with the problem and act on it; engage in fun, relaxing activities; exercise; reduce demands; view the problem as a challenge to be resolved; try to find something positive or funny about the situation).

With the help of a teacher or counselor, the student can then periodically describe difficult emotions or behaviors that have occurred, their reactions, their behaviors and strategies, the outcome, and alternative strategies for the future.

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## Tutorial: Flexibility Versus Rigidity In Thinking And Behavior

(See also Tutorial on Perseveration)

### WHAT IS RIGIDITY/INFLEXIBILITY?

Cognitive and emotional flexibility are included in most lists of executive or self-regulatory functions. Cognitive flexibility enables students to shift effortlessly from task to task at school, from topic to topic in conversation, from one role to another in games, and the like. Emotional flexibility enables students to experience the full range of emotion, like happiness, sadness, or anger, but be able to express them appropriately and then leave that emotional expression behind when it is time to move on.

Most individuals commonly report that changes in well established routines can be difficult to adjust to. For example, beginning a new job or having a first child frequently entail major changes in life routines that cause stress for anybody, despite the adequacy of their cognitive and emotional functioning. Similarly, most people report that there are some ways of thinking about things that are hard to change. It is possible for anybody to get stuck in a rut of doing things in a certain way or thinking in a certain way. When difficulties accepting change, making transitions, shifting thoughts, or moving on from an emotional state become so extreme that they interfere with everyday functioning, then the person is said to be inflexible to a clinically significant degree.

### WHY IS RIGIDITY/INFLEXIBILITY IMPORTANT FOR SOME STUDENTS AFTER TBI?

Students with TBI or other neurological conditions sometimes demonstrate extreme forms of rigidity or inflexibility. Rigidity/inflexibility is often associated with damage to the frontal lobes, the most common site of injury in TBI. Therefore, some degree of inflexibility is common in students with TBI. This may manifest itself as difficulty (1) making transitions during the school day (e.g., from lunch or gym back to classroom work), (2) tolerating changes in schedules or everyday routines, (3) adjusting to changes in staff, (4) ending an intense emotional feeling, and the like. In extreme cases, a transition as apparently simple as from sitting to standing may be difficult and cause stress.

Related but not identical to inflexibility is the phenomenon of perseveration. Perseveration is a possible result of neurologic impairment and is characterized by continuation of the same behavior or thought or words or emotions after the reason for the behavior, thought, word, or emotion has passed or the thought or behavior is no longer appropriate to the situation. . For example, a student may remain focused on a given emotional behavior state long after the reason for that state has been forgotten.

### WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHO ARE RIGID/INFLEXIBLE (See also Tutorials on [Transition Routines](#); [Self-Regulation Routines](#); [Perseveration](#))

Understanding: In every domain of functioning, step one is to understand the student and his or her strengths and needs. In the case of neurologically inflexible students, understanding is critical. In the absence of this understanding, staff and family will inevitably become frustrated and impatient with the student as he proceeds inflexibly through well established routines and rituals.

Procedures to Follow: Beyond understanding the nature of the problem, the following procedures may be helpful.

1. Self-Regulation Routines: Please see the tutorial on [Self-Regulation Routines](#). Several of these routines are relevant for students who are inflexible, including the problem-solving script, big deal/little deal script, ready/not ready script, and others. The goal is to use simple everyday scripts of interaction to help the student internalize self-regulatory thoughts that can help during times of stress, including stressful transitions and changes.

2. Routines to Change Routines: “Flexibility Routines”: Students who are concrete thinkers, disorganized to some degree, and dependent on concrete routines usually have great difficulty when their routines are violated or need to be changed. Because these students are dependent on routines, they need routines to deal with changes in routines. This may sound paradoxical, but it is very important for these students. Well-designed routines for changing routines can include some of the following options, depending on the student’s level of concreteness and other abilities:

(a) Discuss the change or new routine well in advance of the change.

(b) Practice the new routines before actually implementing them.

(c) When the change is implemented, use behavioral momentum-building activities to help put the student in the best frame of mind for the change. [See [Tutorial on Positive Behavioral Momentum](#)]

(d) Sometimes specific “mantras”, or focused “self talk” strategies, are useful during stressful changes (e.g., “I don’t like change, but this will be OK.”)

3. Use of Concrete Organizers: Students who are inflexible often benefit from very concrete graphic organizers with clear visual displays . For example, they may have a photo sequence that represents their schedule in school. An upcoming change can then be represented by moving the pictures. When this is done in a very concrete way with the student, change may be easier to tolerate. [See [Tutorial on Graphic Organizers](#)]

4. Assurance That Some Routines Will Remain Unchanged: Students who have difficulty with change tend to be anxious students who take comfort in some favorite routines (e.g., watching the same video every day after school; following favored rituals around dressing, eating, and the like). If these favored routines are consistent with an orderly life at home or at school, they should be respected. If students are expected to deal with change in some domains, they function best when they have other domains in which they can be comforted by their favored routines.

5 Peer Support: When it is known in advance that there will be a change in routine, it may be well to pair the inflexible student with a peer who can help the inflexible student through the change.

6. Sense of Self and Acceptance of Change: It is useful to help a student develop a positive sense of self – possibly tied to some heroic figure who is famously flexible – that can help the student build better tolerance of change that can then mold into a positive sense of personal identity after injury. The student should be encouraged to say, “I can be a \_\_\_\_\_ kind of person” where the blank is filled in with, for example, a professional athlete who frequently changed teams or positions (if that is meaningful for the student).

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## Tutorial: Impulsiveness / Disinhibition

### WHAT IS IMPULSIVENESS?

An individual who is impulsive has difficulty inhibiting strong responses, desires, or emotions, stopping an ongoing activity, and inhibiting competing responses during delays or quiet times in activities. Everybody has trouble inhibiting impulses from time to time – certainly anybody who has ever been on a diet recognizes impulse-control problems as the powerful force that they can be. Young children are perhaps the best example of impulsiveness or lack of inhibition. Toddlers, for example, explore everything in their environment regardless of danger to themselves or vulnerability of what they are exploring. Their environment needs to be strictly controlled to keep them safe and under control.

Adequate impulse control implies that an individual is able to control observable behavior, as well as thoughts and emotions. Individuals who are impulsive have difficulty inhibiting their emotions and have difficulty quieting their emotions when they occur. For example, a student who lacks impulse control may react to teasing from others with anger followed by uncontrolled escalating anger. These poorly controlled inner emotions then easily lead to poorly controlled, impulsive reactive behavior.

Individuals who are impulsive also have difficulty controlling their impulsive thinking. These impulsive thoughts lead to “one-stop shopping” in academic work. For example, a student may respond to a teacher’s question or test item with the first thought that enters her mind, only to belatedly consider the long-term outcomes of the approach taken.

Impulse control problems can lead to many other difficulties. For example, impulsive individuals have difficulty formulating goals (other than immediate goals), creating plans to achieve the goals, and implementing the plans. They often have difficulty deferring gratification, accepting some small immediate reward rather than waiting for a larger pay-off. They often have severe organizational problems, both organizing their things (e.g., items in their desk at school) and organizing their thoughts. Their expressive language – spoken and written – might be rambling and disconnected, with no logical order. They may have a weak sense of time, not recognizing, for example, that the test on Friday is coming quickly, requiring action now.

Attention deficit hyperactivity disorder (ADHD) is one of the most common disability diagnoses in childhood. The most highly regarded theory of ADHD, advanced by Russell Barkley, is that impulse control problems – difficulties inhibiting emotions, thoughts, and behaviors – lie at the core of the disorder. Impulse control problems lead to other problems with self-regulation: (1) difficulty regulating emotions, arousal, and motivation, (2) difficulty organizing thoughts and behavior, (3) difficulty directing oneself with internal speech, and (4) difficulty holding items in mind long enough to reflect on them (working memory).

### WHY IS IMPULSIVENESS IMPORTANT FOR MANY STUDENTS AFTER TBI?

Many students with TBI had a pre-injury diagnosis of ADHD. It may have been their impulsiveness or high activity level that placed them at risk for their injury. These children typically experience an increase in their ADHD symptoms after the injury.

However, even without a pre-injury diagnosis of ADHD, many students with TBI have symptoms very similar to those with a diagnosis of ADHD. They have difficulty inhibiting thoughts, emotions, and behaviors; they are disorganized in their thinking and acting; they have difficulty regulating themselves with self-talk, and they have difficulty modifying their behavior in response consequences (rewards and punishments). These problems are associated with damage to the frontal lobes. Students with impulse-control problems appear to be immature relative to their age and relative to their other abilities.

## WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHO ARE IMPULSIVE?

### Understanding the problem

As always, the first task for teachers and parents is to correctly understand the problem. If neuropsychological testing or systematic real-world exploration reveals impulse-control problems related to the brain injury, then the following intervention and support options should be considered.

### Pharmacologic Intervention

The psycho-stimulant medications often used with students with ADHD may be useful for students with impulse control symptoms after TBI. However, thoughtful consideration of all brain injury related environmental control strategies and other types of medications should be considered prior to a decision to treat the ADHD-like symptoms with medications.

### Environmental Control Strategies

A. “Child Proofing” Strategies: Much of the intervention for students who are impulsive is environmental, that is, teachers and parents control the environmental events outside of the student to reduce the likelihood of negative impulsive behavior. These environmental controls can be understood as aspects of “child proofing” the environment, much as one “child proofs” the environment for the safety of a toddler. These environmental modifications should be understood as analogous to the ramps, lifts, and the like needed for people in wheelchairs. Carefully organizing the environment is not “coddling” the student, but rather implementing a procedure based on recognition of a genuine neurological need. In a school setting, child proofing the environment has the following components:

1. Childproof the physical environment: Make sure the students are not exposed to dangerous situations; make sure that they are not overly tempted by readily accessible and highly desirable things that predictably distract them from the task at hand or elicit impulsive or negative behavior.
2. Childproof the activity environment: Make sure that the students are capable of doing all that is expected and requested of them. If the adult is the student’s collaborator (i.e., partner or team member – versus tester or drill master), then the student will always be better able to complete the task. This approach can lead to students becoming more independent as they gain competence and confidence in completing a given activity.
3. Childproof the social environment: Make sure that students are with other students with whom they are reasonably compatible. Prevent social interactions that are threatening or cause agitation. Make sure that informed and supportive adults are with the students during predictably difficult times and tasks.
4. Childproof the expectation environment: Make sure that expectations for the student’s performance and participation are appropriately adjusted relative to abilities, stressors, moods, illness, tough times, and the like. For example, parents of two-year olds try hard to make these adjustments – and it is important in school as well, in the case of students who are particularly immature in self-regulation.
5. Childproof the known stressors, such as transitions and changes in routine: Students with impulse-control weakness have difficulty handling transitions (even apparently simple transitions from, say, snack back to work) and expected as well as unexpected changes in routine. Try to insulate the student from such identified stressors by careful planning and providing needed preparation and special support during transitions and at times of change in routine.

B. Behavior Management Strategies: Several critical behavior management guidelines apply to children who have impulse-control problems.

1. Reliance on “Antecedent Control” Rather than Consequences of Behaviors: Students who are significantly impulsive do not respond effectively to behavior management systems that rely on consequences. There are two reasons for this ineffectiveness in students with TBI. First, the student’s impulses typically over-ride any behavior management associations that have been created by previous rewards and punishments. Second, the part of the brain that enables humans to control their impulses (“orbito-prefrontal cortex”) is the same part of the brain that enables humans to learn from consequences or benefit from feedback. Therefore, behavior management systems that rely on learning from consequences predictably fail for these students. The student might “know what to do”, but nevertheless not do it. That is, impulsiveness creates a breakdown between knowing and doing.

Teachers and parents should not frustrate themselves and the student by relying on consequences to effectively shape the behavior of these students. The golden rule should be “a pound of prevention for every ounce of reaction.” [See Tutorials on [Positive Behavior Supports; Behavior Management; Prevention Strategies](#)]

2. Immediate Consequences: If consequences are used in the management of behavior, the consequences need to be immediate since (1) the student’s attention and self-control problems may make it impossible to control behavior in anticipation of a distant reward and (2) the student’s impairments in memory may limit longer term recall of impulsive behaviors. It is unreasonable, for example, to expect an impulsive student to change behavior with the threat of losing free time later in the week or at the end of the day. The time delay is too great for this to have an impact. Among other problems, the student’s weak orientation to time and long-term memory difficulties render these consequences relatively useless.

3. Obvious “Salient” Consequences: If consequences are used in the management of behavior, they should be clear, obvious, and immediate. For example, tangible rewards would be more likely to have an impact than verbal praise alone. For students who are both impulsive and hyperactive, activity rewards – being allowed to engage in special physical activity – should be used liberally.

4. “A Pound of Positive for Every Ounce of Negative”: When consequences are used in behavior management, adults should try to ensure that the consequences are largely rewards for positive behavior versus punishments for negative behavior. For example, students should receive intense praise for raising their hands as opposed to punishment (e.g., losing points) for talking out of turn. Emphasis on the negative tends to breed greater negativity and a growing sense of self as incompetent. It has been shown that public reprimands for negative classroom behavior increase rather than decrease that behavior in the case of impulsive students.

C. Other Environmental Management Strategies: In addition to the five “child proofing” strategies listed above, there are other environmental management strategies that might be useful in preventing undesirable impulsive behaviors:

1. Well organized schedules and routines: Both at school and at home, schedules and routines should be as consistent as possible. Schedules may need to be represented by ordered pictures, or written words embedded into personal organizers. At home, the schedule should be organized around homework, chores, family times (e.g., meals), and the like. Students who are impulsive generally organize their behavior more effectively when the world around them is organized effectively. At the same time, too much routine may cause boredom and impulsive “novelty-seeking” activity for stimulation. Thus routines should be accompanied by adequate reward activities, humor, and other forms of valued activities to prevent boredom.

2. Prompt Cards: Prompt cards reminding the student what to do and when to do it may be needed as a substitute for the “voice in the head” reminder system that highly impulsive students lack. These prompt

cards can be controlled by the adult (teacher or parent) or controlled by the student as a system of self-cuing.

3. **Teacher-Directed Lessons:** Learning activities in which the teacher plays an active role in engaging the students are easier for impulsive students than quiet seat work or other student directed activities. The more interesting the learning projects and materials, the better. When self-directed seat work is required, teachers should check in regularly with impulsive students to ensure that they remain on task. During lectures, ask the impulsive student questions as a preset to listen for specific information.

4. **Reasonably Fast-Paced Tasks and Redirection of the Student:** Students who are impulsive and distractable generally perform better when their tasks are fairly fast paced (consistent with their processing abilities). Pauses, down times, and low stimulation times are often occasions to drift off or engage in impulsive behavior. Directed refocusing is necessary when an impulsive student becomes distracted during a task.

5. **Clear, Repeated, and Pictured Instructions:** Impulsive students tend also to be disorganized. Very clear and repeated instructions are necessary. Instructions may also be written and possibly also graphically represented (e.g., photos or symbols).

6. **Breaking Large Tasks into a Series of Small Steps:** Impulsive students easily get “lost” in large tasks, resulting in an increase in off-task impulsive activity. The students do better with a series of small tasks with clear markers of completion for each step.

7. **Careful Maintenance of Topics:** Impulsive, easily distracted students have difficulty following disorganized conversations, lectures, and the like. In classroom or home discussions, teachers and parents should try to maintain topics rather than jumping from topic to topic. Topic shifts should be clearly announced ahead of time. In group discussion, provide some sort of physical “talking stick” that gets passed from speaker to speaker and indicates who should be talking at any given time. This helps prevent talking out of turn. Parents and teachers need to provide direct feedback to the student when he goes off topic and provide links back to the original topic to help the student refocus.

8. **Clear Transition Routines:** [\[See Tutorial on Transition Routines\]](#)

9. **Appropriate Levels of Stimulation:** Some students who are impulsive and easily distracted do best in quiet, low stimulation environments. Other students may do better in more stimulating environments since these students have more difficulty with the internal distractions when placed in quiet environments. These student may attend and learn more effectively in familiar, but more stimulating environments. Identifying the appropriate level of stimulation may require some exploration.

10. **Peer Interaction or Teacher’s Assistant Roles:** It is often useful to engage impulsive students positively with brief peer interaction activities during lessons or with teacher helper activities.

11. **Activity Breaks:** Students who are impulsive are also often energetic, needing regular physical activity. Transitions between activities are good times to engage in some sort of physical activity to discharge energy and get ready for the next activity. Frequent breaks may be useful. Impulsive students should be given structured physical activities to complete during these breaks.

12. **Choices:** For students who are both impulsive and oppositional, ensuring that they have some choices to make within their school and home routines is essential. Providing two or three options to choose from is often helpful for these students.

13. **Organization for Large Projects:** Work with the student to map out large projects into do-able steps, starting early and setting small deadlines towards task completion. Graphic organizers are very helpful in



allowing students to monitor their progress in completing agreed upon tasks. [See Tutorial on [Organization; Graphic Organizers](#)]

## **Student Self-Management Strategies: Change the Student Versus the Environment**

The long-term goals for all students are not simply compliance, attention to task, and efficient learning. To be successful adults, students need to learn how to regulate their own behavior and learning without ever-present adult support. They need to become self-regulated. Thus, in addition to environmental strategies, home and school environments also need routines designed to allow a gradual increase in the student's responsibility for self-management or self-regulation. As always, adults must thoughtfully identify appropriate expectations and levels of responsibility that can be given to the student at any given time.

1. **Self-Regulatory Routines/Scripts:** See [Self-Regulation/Executive Function Routines](#) for information about self-regulatory self-talk and the adult-child scripts of interaction that lead to self-regulatory self-talk by the student. Of particular importance for impulsive students are the "Ready/Not Ready" script and the general "Goal-Obstacle-Plan-Do-Review" (GOPDR) script. A habit of asking "Am I ready?" helps to block impulsive decision making and behavior. The general GOPDR script helps to create a habit of planful behavior as well as self-monitoring.

2. **Self-Organized Tasks:** Starting in the early elementary years and extending through high school, adults should engage students in collaboratively breaking large tasks into parts that can be organized effectively. Gradually over time the responsibility for organizing tasks should be turned over to the student. Logging of steps to complete each project should be written in an organizer and reviewed with the student to help the student gain confidence in organizing and following through on component steps in a project.

3. **Self-Imposed Deadlines:** As with general organization of their tasks and activities, impulsive students should increasingly be given responsibility for creating small deadlines for when the steps in a task need to be accomplished. An organizer can be used to monitor the steps that need to be accomplished and their completion of the steps.

4. **Self-Monitoring Systems:** Both at home and at school, adults should help impulsive students to create and use self-monitoring systems. These systems include checklists for keeping track of homework or household chores and organizers for long term tasks. [See Tutorial on [Self-Monitoring.](#)]

5. **Self-Stimulating Activities That Do Not Disturb Others:** Impulsive students who are also hyperactive tend to be physically active and may move or create disturbances for other students. However, movements may be necessary for the impulsive student to remain focused. Thus movement activities need to be identified that do not disturb others. For example, tapping a pencil that has a foam cover on the eraser end may satisfy the active student without bothering others.

6. **Self-Imposed "Cool Down":** Many students who are impulsive have difficulty controlling their emotions. Thus they may become over-emotional in school, leading to aggressive or other challenging behaviors. These students need help recognizing the first signs of rising emotion or agitation (called "triggers"), and learn to gradually take responsibility for then removing themselves from the potentially difficult situation. Many schools create opportunities for "self-time-out" for these students. Initially, parents and teachers may need to be more active in alerting a student about their rising emotions and recommend "cool-down time" for the student.

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## Tutorial: Inconsistency In Performance

### WHAT IS INCONSISTENCY?

Everybody experiences good days and bad days. For example, individuals may “get up on the wrong side of the bed”. This feeling might include being irritable, processing information slowly, and in general feeling not as sharp or not feeling at the top of ones game. In many situations, this inconsistency in behavior or everyday academic performance is not easy for others to understand or manage – especially when the inconsistency is extreme. Students may appear to understand a concept and demonstrate skills one day only to show minimal understanding or skill the next.

### WHY IS INCONSISTENCY IMPORTANT FOR MANY STUDENTS AFTER TBI?

Students with TBI or other neurological conditions often demonstrate marked inconsistencies in their behaviors on a day to day basis. Teachers remark that some days the student seems to have a skill mastered or facts learned only to have lost this skill on the next day. Or under some conditions the student seem to have a few “splinter skills” mastered, yet other skills assumed to be learned are not.

Inconsistency is associated with brain injury for a variety of reasons:

1. **Frontal lobe injury:** Damage to the frontal lobes may cause a student to have sharply exaggerated “good days” and “bad days”. That is, there is less control over the physical or psychological states that may under normal circumstances have only a small effect on learning and performance abilities.
2. **Specific retrieval problems:** Many students with TBI have specific problems retrieving words or information or skills that are stored in their long-term memory. Because of this, tasks that involve retrieval may be performed successfully on one occasion but not on another. **[See Tutorial on Retrieval; Word Retrieval.]**
3. **Inconsistent profile of abilities:** Many students with TBI retain many skills and much of the information learned prior to the injury, but they experience a marked decline in their ability to learn new skills and information. Or their recovery of preinjury learning may be spotty, with some information and skills recovered and others not recovered. Both of these phenomena result in unusual profiles of knowledge and abilities that can be misinterpreted as inconsistencies in performance in the classroom.
4. **Concreteness in thinking and learning:** Some students with TBI (especially those with more focal frontal lobe injury) tend to be more concrete, or factual, in their thinking and learning. These students may learn a skill or piece of information, but make concrete associations with some aspect of the learning context. Therefore, if the context changes, these same students may not be able to demonstrate or generalize the skills or may be unable to retrieve the information needed to plan an appropriate strategy. **[See Tutorial on Concrete Thinking and Learning.]**
5. **Emotional problems:** Because of the many changes in life after a TBI, many students experience strong and sometimes lasting emotional reactions, including difficulties with depression and anxiety. Both of these emotional conditions are associated with inconsistency in performance. **[See Tutorial on Depression and Anxiety.]**
6. **Fatigue:** Most students with brain injury experience substantial fatigue. Fatigue may be extreme on some days, contributing to the appearance of inconsistent performance. Fatigue may also increase during specific times during the school day (e.g., during more cognitively demanding classes). **(See Tutorial on Fatigue).**

7. Seizures: In some cases, seizure activity may contribute to inconsistency in performance. (See Tutorial on [Seizures](#))

## WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHOSE PERFORMANCE IS ESPECIALLY INCONSISTENT?

Step one is to try to identify the source of the inconsistency. [See Tutorial on [Hypothesis Testing: Inconsistency](#)] If the source of inconsistencies can be identified, then intervention and support decisions can be focused to address the problem. For example, intervention and support decisions will be different if the primary issue is an emotional problem versus specific memory/retrieval problems.

Whatever the source of the inconsistency, the following procedures are useful.

1. Information gathering and communication: If a student demonstrates sharply different learning and performance abilities on a day to day basis , parents and the school should have a system for communicating information about the student’s daily abilities. When staff are alerted in advance to the student’s state, they are in a better position to make the adjustments that have been decided upon in advance.
2. Staff flexibility: Educators and parents must be prepared to adjust expectations, tasks and supports for students who experience marked inconsistencies in performance abilities.
3. Fall-back procedures: Staff should make decisions in advance about how they plan to adjust schedules, supports, and instructional strategies once decisions are made about the student’s current state. Staff should know what supports to put in place on days that are identified as “difficult” days. [See [Tutorials on Instructional Routines; Performance-Oriented Teaching versus Support-Oriented \(Apprenticeship\) Teaching](#)]
4. Instructional routines: Decisions can be made about modifications within instructional routines, based on the student’s state. [See Tutorial on [Instructional Routines.](#)] Higher levels of support are needed when the student is having a difficult day. Staff should make decisions in advance about modifications of instructional routines when the student is having difficulty.
5. Plans to address student’s fatigue and need for rest periods: Parents should try to ensure a full night of sleep before a school day. Schools may also need to preplan needed rests for the student. If a student is excessively tired, arrangements for rest time or naps might be necessary at school.
6. Student participation: As much as possible, students should be encouraged to identify the state they are in (e.g., really tired; “fuzzy in the head”) and collaborate with staff in choosing relevant supports.
7. Seizures: If seizures are suspected, medical follow-up is indicated.

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## Tutorial: Self-Regulation / Executive Function Routines After TBI

### WHAT IS SELF-REGULATION?

An important goal of the educational system is to have children learn how to regulate their behavior so that they deliberately act in a way that is consistent with school and social rules and the needs of others, and that is also strategic in relation to their learning and academic success. The same self-regulatory skills underlie social/behavioral self-regulation (e.g., inhibiting impulses, deferring gratification, benefitting from feedback) and cognitive-academic self-regulation (e.g., strategic reading, effective studying, taking responsibility for academic success).

Self-regulation (sometimes referred to as executive functioning) develops very gradually in children, beginning in infancy and continuing through the adolescent years. The development of self-regulation is positively influenced by:

1. Neurologic maturation, especially development of the frontal lobes of the brain;
2. Stability, organization, and predictability in the home environment;
3. Reasonable emotional attachment of children to important adults in their life;
4. Adequate opportunities for children to exercise control over events in their life;
5. A parenting style that steers between the extremes of permissiveness (at one end) and an overly authoritarian and controlling style (at the other end). Many people call this middle ground an “authoritative/responsive” style of parenting;
6. An environment that models, values, and rewards self-regulation, autonomy, and personal responsibility;
7. Reasonably effective development of language, for communication as well as for problem-solving and self-regulatory self-talk;
8. Positive adult-child interactions that include the regulatory words, procedures, and themes that will eventually be internalized by children to become their internal self-regulatory system. Adult interaction with children, if well conceived and frequently repeated, ultimately becomes appropriated by the children as an internal self-regulation system (see below). Adult words, if well selected and used on the right occasions, become the child’s self-regulatory thoughts.
9. Development of a coherent and positive sense of self.

### WHY IS SELF-REGULATION IMPORTANT FOR MANY STUDENTS AFTER TBI?

Many children arrive at school with relative (and in some cases extreme) self-regulatory immaturity. They regulate their behavior poorly (e.g., impulsively grabbing or lashing out at other children); they regulate their emotions poorly (e.g., crying when impulses cannot be satisfied); and they regulate their cognitive and academic behavior poorly (e.g., not planning before starting a task, not monitoring their work, not using strategic procedures to succeed with difficult tasks). In this respect they may be much like preschoolers even though their physical and perhaps intellectual development is at a much higher level.

Students with brain injury often have significant difficulty with self-regulation because of damage to the frontal lobes, the part of the brain most commonly associated with self-regulation (or executive functions). Their self-regulatory difficulties might include any combination of the following (all relative to age expectations):

1. Weak understanding of their own abilities and needs
2. Difficulty setting reasonable goals for themselves
3. Difficulty making plans to achieve their goals
4. Difficulty organizing their behavior, their thinking, and their talking.

5. Difficulty inhibiting impulses; acting impulsively
6. Difficulty initiating needed activities or strategies at the right time
7. Difficulty monitoring their own performance and evaluating it in relation to their goals
8. Difficulty thinking and acting strategically in relation to their goals; difficulty solving problems in an organized manner
9. Difficulty learning from consequences
10. Difficulty learning a skill in one setting or context and transferring it to another
11. Difficulty shifting flexibly from one activity to another, from one thought to another, or from one strategy to another

Depending on the severity of the injury, these problems may be observed in the early weeks or months after the injury, but then resolve as the student recovers. In other cases, some combination of these problems remains constant due to specific frontal lobe injury. When children are injured at an early age, the problems with self-regulation may become more severe over the years after the injury because the child is expected to mature in these domains of functioning, but does not because of the injury to the brain. Thus the problems may appear to be more severe as the student ages.

## **WHAT ARE THE MAIN FEATURES OF INTERVENTION AND SUPPORT THAT ARE IMPORTANT FOR STUDENTS WITH SELF-REGULATION PROBLEMS AFTER TBI?**

### **UNDERSTANDING THE PROBLEM**

As with all problems, step one is understanding the problem. Self-regulation problems are easily misidentified as behavior problems. For example, educators may assume that a student with initiation problems is deliberately resistive of school work. Or a student with inhibition problems may be judged to be “acting out”. Or a student with self-monitoring problems may be seen to lack concern for the quality of his work. Psychological testing may help to identify specific self-regulation/executive function problems. The problem-solving system on this web site may help teachers and parents sort out contributors to the student’s difficulties using the contexts and routines of everyday life in school and at home.

In addition to students with TBI, many other populations of students are vulnerable for problems with self-regulation. These include ADHD, autism, fetal alcohol syndrome, learning disabilities (in some cases), students from challenging environments and disorganized home environments, and others.

### **ENVIRONMENTAL SUPPORTS**

Maturation of self-regulation is very gradual from infancy to adulthood. But in thinking about students who are immature in this domain, it is often useful to think in common sense terms about how parents manage two year olds. In managing the behavior of a two-year old – or of students with significant self-regulatory problems – the following nine principles of environmental management are most important.

1. “Childproof” the environment (see five types of “child proofing” below).
2. Create everyday routines of activity and interaction that are well understood by the students and effectively supported, so that they experience success in their lives.
3. Expect impulsive and poorly regulated behavior from time to time, especially if the student is tired or stressed, there are changes in routine, the environment is overly stimulating (or possibly understimulating), or demands are high. Remain calm. Adult anxiety and agitation increase the student’s anxiety and agitation.
4. Don’t expect immature students to routinely regulate their behavior effectively – control impulses and defer gratification – in relation to a distant goal (e.g., control impulses now in order to get a

reward or avoid a punishment at the end of the day) or an abstract rule (e.g., “think about others’ needs, not just your own”).

5. Use behavior management procedures that are proactive, positive, and supportive. That is, set the student up for success rather than reacting to his failures. Negativity and punishment usually breed a downward cycle of more negativity and punishment with developmentally young children. (See behavior management suggestions below.) **(See Tutorials on Behavior Management: Prevention Strategies; Positive Behavior Supports)**
6. Use an interactive and teaching style that is positive and supportive (versus threatening and “testing”). (See “General Teaching Interaction” below.)
7. Use everyday conversational routines of interaction that are designed to become internalized by the students as their own self-regulatory system. **(See “Self-Regulation Scripts” below.)**
8. Ensure that instructions and expectations are clear. Use consistent instructional routines and concrete (e.g., graphic) organizational supports liberally. **(See “Concrete Graphic Organizers” below.) (See Tutorials on Instructional Routines; Graphic Organizers; Apprenticeship Teaching)**
9. Help the child develop a sense of self that includes competence and a desire for self-regulation. **(See Tutorial on Sense of Self.)**

## “CHILD PROOFING”

In a school setting, “child proofing” the environment has the following components. Of course there are many degrees of support under the heading “child proofing,” ranging from total support to minimal support. Good judgment is required in deciding how much support should be provided at any given time in any given context. As with all support-oriented interventions, the supports should be systematically reduced as the student gains competence.

1. Childproof the physical environment: Make sure that students with self-regulatory weakness are not exposed to dangerous situations; make sure that they are not overly tempted by readily accessible and highly desirable objects or activities that predictably distract them from the task at hand or elicit impulsive or negative behavior.
2. Childproof the activity environment: Make sure that the students are capable of doing all that is expected and requested of them. The comments below about flexible supports and collaborative (“team”) participation and teaching (versus solo performance) are relevant here. If the adult is the student’s collaborator (i.e., partner or team member – versus tester or drill master), then the students will always be able to complete the task – and can become more independent as they gain competence.
3. Childproof the social environment: Make sure that students are with other students with whom they are reasonably compatible. Prevent social interactions that are threatening or cause agitation. Make sure that trained and supportive adults are with the students during predictably difficult times and tasks.
4. Childproof the expectation environment: Make sure that expectations for the student’s performance, participation, and self-regulation are appropriately adjusted relative to abilities, stressors, moods, illness, tough times, and the like. For example, parents of two-year olds try hard to make these adjustments – and it is important in school as well, in the case of students who are particularly immature in self-regulation.
5. Childproof the known stressors, such as transitions and changes in routine: Students with self-regulatory weakness are notorious for having difficulty with transitions (even apparently simple transitions from, say, snack back to work) and changes in routine. Try to insulate the student from such known stressors with good preparation and special support during the transitions and at times of change in routine. **(See Tutorials on Flexibility; Transition Routines.)**

INSTRUCTIONAL STRATEGIES TO ASSIST STUDENTS WITH SELF-REGULATORY DIFFICULTIES

**See Tutorials on components of self-regulation for instructional strategies specific to that component: Self-Awareness; Organization; Advance Organizers, Inhibition; Initiation; Self-Monitoring; Cognitive and Learning Strategies; Problem Solving; Flexibility; Anger Management; Egocentrism; Sense of Self.**

### **General Self-Regulation (Executive Function) Scripts /Routines For Use at Home and at School**

What follows are some thoughts about the concept of executive function or self-regulatory scripts for use with students with self-regulatory problems. The core idea is that *self-regulation is internalized self-talk* – and children need to learn this self-regulatory self-talk at school and ideally at home as well. Self-regulation as internalized self-talk is a theme that applies to all children. However, it is a particularly important theme for children who do not “pick up” self-regulatory self-talk in the ordinary course of everyday interaction with adults and older children.

The general goal is to create a large number of opportunities over the course of everyday activities at home and at school for students to engage in these scripts with staff and family. Initially, the script will be mainly the responsibility of the adult (teachers, assistants, therapists, parents, others). Gradually the students should be able to contribute some aspect of the script. In other words, the scripts should start as adult statements (e.g., “John, I think this might be hard for you ... because we just started fractions and they are tricky ... so you’ll probably need to ask me for help when you get stuck; I know that will work, OK??”). As the student gains competence, the scripts can become questions (e.g., “John, do you think this will be hard or easy for you? ... And why do you think it might be hard? ... So what do you plan to do to succeed?”). Ultimately the questions might be replaced with simple gestures, triggering the appropriate self-regulatory script from the student. The ultimate goal is that the script will be internalized by the student so that it becomes his self-regulatory thought process. This may potentially take years and a very large number of learning trials.

The scripts can easily be used with a small group of students or an entire class, as well as in one-on-one interaction. Many teachers who take self-regulation seriously create posters of the self-regulation scripts (or just their titles, like “Big Deal/Little Deal”) and display them on the classroom walls. In this way the teachers remind themselves to use the scripts routinely with the class as a whole as well as with individual students. Thus a culture of self-regulation is created in the classroom and ideally throughout the school. In schools that have adopted this culture of self-regulation, principals have reported decreases in disciplinary referrals, decreases in referrals to special education, and increases in academic performance as measured by standardized tests.

#### **Cautions and Reminders: The following cautions and reminders are in order:**

1. The specific words may need to be modified to fit individual students’ age, vocabularies, and sensitivities.
2. These scripts should be pleasant. Adults must be careful to avoid turning them into threats, nagging, or other irritating interactions. Under those negative circumstances, the scripts would be counter-productive – students would predictably come to hate self-regulatory coaching. For example, if a teacher says angrily to the students, “You must show me you’re ready and show me right now!!”, the students will come to have negative associations with the “ready/not ready” script and never accept it and internalize it as their own self-regulation. Similarly, if a teacher threatens a student by saying, “You have a choice, young man; You can get your work done right now or you can get sent home!!”, the student will have negative associations with the “choice/no choice” script and never accept it and internalize it as his own self-regulation.
3. The scripts should be used routinely on those occasions when it would be desirable for the students to have in their heads the self-regulatory thought that is articulated by the script. For example, when faced with a new task, all students (and adults) should automatically ask themselves if the task might be difficult, if so why, and if so what they are going to do to succeed. Therefore, on the occasion of presenting a new task, the teacher should use (or elicit) the “Hard/Easy” script. Similarly, when faced with a situation that might be stressful, all students (and adults) should automatically ask themselves if the situation is really a big deal, if so why, and if so

what they plan to do about it. Therefore, on the occasion of sensing a potentially stressful situation, the teacher should use (or elicit) the “Big Deal/Little Deal” script. This script can often be used to diffuse situations – to help the student see that a situation that seems like a big deal is really not such a big deal.

4. The scripts should mainly be used under positive circumstances so they have positive associations. For example, the “big deal/little deal” script should mainly be used for positive “big deals” or non-stressful “little deals”. It may be tempting for staff to use the scripts mainly or only when they feel a need for behavior management tools – that is, during negative times. Unfortunately the scripts will come to have negative associations under those conditions. Staff should ensure at least one or two uses of the scripts under positive conditions for every one use under stressful conditions. The goal is to create positive associations – and avoid negative associations – with the scripts.
5. The scripts must be used frequently. The ultimate goal is for the student to bring the relevant self-regulatory script to mind automatically when the situation calls for it. Over time the student may begin to use the scripts without even bringing them to conscious awareness.
6. Adults must decide which of these scripts are most important, so as to avoid overwhelming the student with too many scripts.
7. In some cases, the scripts should be presented in a highly “telegraphed” manner – with very few words. Adults should make good judgments about how much language and discussion to use with a specific script. For example, it is not wise to allow the scripts to devolve into an extended argument.
8. Adults should pull back supports as the student acquires and gradually internalizes the scripts. For example, the progression can be from the adult stating the script to the adult asking scripted questions to the adult simply signaling to the student that a self-regulatory script is relevant to, finally, no support.

In working with adolescents, the scripts or routines can be called “Self-Coaching Plays”. The sports metaphor might make the scripts seem more mature and appealing for that age group. But the general ideas are the same.

#### **GENERAL FORMAT FOR THE MOST GENERAL SELF-REGULATORY SCRIPT**

What follows is a general outline of how people achieve success when tasks are difficult. One of the goals of education is to plant this important self-regulatory template into the heads of the students – particularly those with disability, because they face more difficult tasks than students with no disability. This script can be used routinely as a template for any deliberate efforts that the students make academically or socially. Teachers can use this script formally, possibly even recording the student’s responses on a form. More commonly the script is used informally and conversationally, possibly omitting parts (e.g., the prediction). Thus it needn’t take much time to complete this script or any of the more specific scripts listed below.

**GOAL:** What’s the goal? What are you trying to achieve? What do you want to have happen? What’s it going to look like when you’re done?

**OBSTACLE:** What is standing or could stand in the way of you achieving the goal? What is the problem?

**PLAN:** So what’s the plan? What do you need to do? Do you need help? Do you want to do it as a team? Do you think that plan will work??

**PREDICTION:** So how well do you think you will do? How many can you get done? On a scale of 1 to 10, how well will you do?

**DO:** [Perhaps solving problems along the way or revising the plan]

**REVIEW:** So how’d it work out? What worked? Anything that didn’t work? Why or why not? What are you going to try next time?



## Video Illustration of Goal-Obstacle-Plan-Do-Review Script

### GENERAL FORMAT FOR SPECIFIC SCRIPTS

What follows are more specific scripts that might be selected as particularly important for specific students – or for the class as a whole. They all can follow the format outlined below – for ease in adult learning:

1. Identify/label the issue (e.g., “This seems to be a problem; This is kind of scary; This is a big deal; I think this might be hard for you.”)
2. State the reason (e.g., “It’s a problem because...; It’s scary because ...; It’s a big deal because...; It’s hard because”.)
3. Offer a strategy (e.g., “We (or you) can do ....; that should help”)
4. Offer general reassurance (e.g., “Great; there’s always something that works, isn’t there?”)

Students will not internalize these critical self-regulatory scripts unless the scripts first become a habit for adults in their interactions with the students.

#### Problem-Solving/Strategic Behavior Script

Importance: All students need to become progressively better problem solvers. However, people with disability need to be more strategic (better problem solvers) than people with no disability because they face so many problems/difficulties in school and in their lives. Often they receive little practice in strategic thinking/problem solving because family and education staff do their strategic thinking/problem solving for them. In typical child development, there is very gradual development in this domain from infancy into adulthood.

Script:

1. Identify/label the issue (e.g., “This seems to be a problem.”)
2. State the reason (e.g., “It’s a problem because...”)
3. Offer a strategy (e.g., “Maybe we/you can ....; that should help.”)
4. General reassurance (e.g., “Great; it worked; there’s always something that works, isn’t there?”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so.

#### Hard To Do/Easy To Do Script

##### Video Illustration of this script.

Importance: This is a critically important self-regulatory routine for people with disability – because it is necessary to know that something is difficult to do if one is going to work hard or be strategic to get it done. People with disability need to work hard and be strategic to get things done. Therefore, it is critical for them to be able to identify what is hard to do versus what is easy to do.

Script:

1. Identify/label the issue (e.g., “This is kind of hard to do, isn’t it?” – or medium hard or pretty easy)
2. State the reason (e.g., “It’s hard/easy to do because...”)
3. Offer a strategy (e.g., “Maybe you should ask for help? Or ....” Or “It’s easy because you did ...”)
4. General reassurance (e.g., “Great; that was kind of hard to do – but you asked for help and we did it. There’s always something that works, isn’t there?”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so. Because many students are anxious and acutely aware of some of their difficulties, it is important that most of these interactions highlight what is easy for them – and that the “hard to do” scripts remain positive in the sense that the focus is on the strategy and success, not on the inability.

### **Ready/Not Ready Script**

#### **Video Illustration of this script.**

Importance: This is a critically important self-regulatory script for students who are impulsive, for example those who may start a task without a plan or without needed materials, and then experience frustration due to inevitable failure. Success in completing tasks often requires doing something to get ready. Therefore this is an important habit to develop.

Script:

1. Identify/label the issue (e.g., “I’m not sure that you’re ready”)
2. State the reason (e.g., “You’re not ready because you don’t have .....”)
3. Offer a strategy (e.g., “I’ll know you’re ready when you....”)
4. General reassurance (e.g., “Great; you look ready. There’s always something that works, isn’t there?”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so.

### **Big Deal/Little Deal Script**

#### **Video Illustration of this script.**

Importance: The long-term importance of having this self-regulatory script is: (1) to help students distinguish what is important from what is not important – so they might be less anxious about little deals and take big deals seriously; (2) possibly to help them break a perseverative set; (3) possibly to help them avoid negative behaviors when staff need to move beyond something that is really unimportant; (4) possibly to help students avoid negative interaction with other students over minor provocation; (5) possibly to get the students engaged in something important at a time when they would prefer not to.

There may be a need to experiment for purposes of identifying the best words to use. Also, start the “Big Deal” script at times when the students are not upset. It is important to avoid creating negative associations with this script from the start.

Script:

1. Identify/label the issue (e.g., “This is a big deal.... or this is not a big deal – this is just a little deal – this is not important.”)
2. State the reason (e.g., “This is just a little deal because we can .....”)
3. Offer a strategy (e.g., “Maybe we can ....”)
4. General reassurance (e.g., “There we go. You see, that was not a big deal. That was just a little deal. And there’s always something that works, isn’t there?”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so.

## **Scary/Not Scary (Safety Judgment) Script**

### **Video Illustration of this script.**

Importance: The long-term importance of this self-regulatory script is: (1) to help develop students' safety judgment; (2) to help them learn from experience. Again, there may need to be experimentation to find the best words to use. More mature language should be used with older students, for example the "safe/not safe" script.

Script:

1. Identify/label the issue (e.g., "This is kind of scary." )
2. State the reason (e.g., "It's scary because you could fall and hurt yourself.")
3. Offer a strategy (e.g., "But if you ..... you will be very safe.")
4. General reassurance (e.g., "There we go. You see, there's always something that works, isn't there?")

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so.

## **Choice/No Choice Script**

### **Video Illustration of this script.**

Importance: The long-term importance of this self-regulatory script is: (1) to help students learn that they have choices in some domains and not in others – and learn how to discriminate between the two domains; (2) to help them learn how to make good choices when they have a choice; (3) to help them accept "no choice" situations. Again, there may need to be experimentation to find the best words to use.

Script:

1. Identify/label the issue (e.g., "You have a choice here; or You know this is a no choice situation." )
2. State the reason (e.g., "This is a no choice deal because....")
3. Offer a strategy (e.g., "Here is what we can do to get through this....")
4. General reassurance (e.g., "There we go. You see, there's always something that works, isn't there?")

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so. It is especially important to use the "Choice/No Choice" script on many positive occasions when there is a choice. If the script is mainly used when the student is upset and has no choice in the matter, then it will come to have negative associations (i.e., "nagging") and will not be useful.

## **Play to Change Plays Script (or "Flexibility Routine")**

### **Video Illustration of this script.**

Importance: Many students with disability are inflexible; they appear to rely on very consistent routines and become upset when change occurs or their expectations are violated. Because they need routine, it is useful to create a "routine to change routines" or a routine to accept change.

Script:

1. Identify the issue: Ideally a change in routine is identified well in advance (e.g., “Today we are going to do .... a little differently.”)
2. State the reason (e.g., “We need to do this differently because....”)
3. Generate a strategy (e.g. “Let’s practice the way we are going to do this today.”)
4. General reassurance (e.g., “We’ll get through this; there’s always something that works.”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so. See also the Tutorial on Transition Routines.

### **“What About You?” Script**

Importance: Many students with self-regulatory impairment have damage or developmental immaturity in the part of the brain associated with the ability to see the world from another person’s perspective. (See Tutorials on Egocentrism; Social Perception.) These students need a great deal of practice – within the routines of everyday life – trying to understand others’ feelings, needs, and perceptions.

Script:

1. Identify the issue: (e.g., “What do you think John thinks about this?” Or “Why don’t you ask Sally how she feels about it?”)
2. State the reason (e.g., “I think John feels ..... because.....”)
3. Generate a strategy (e.g. “So it would probably be a good idea for you to.....”)
4. General reassurance (e.g., “Great! He’s feeling better. There’s always something that works.”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so.

### **Experimental Script**

#### **Video Illustration of this script.**

Importance: Students benefit from an increasingly experimental approach to what works for them and what does not work for them. That experimental orientation can be facilitated through everyday interaction between the student and teachers or parents. Furthermore, most students interpret this experimental orientation as an act of respect.

Script:

1. Identify/label the issue (e.g., “John, you and I have different ideas about how to get this done.”)
2. State the reason (e.g., “We disagree because.....”)
3. Offer a strategy (e.g., “Let’s try it both ways and see which works best....”)
4. General reassurance (e.g., “There we go. You see, there’s always something that works, isn’t there?”)

Gradually reduce external support (e.g., switch from statements to questions) as the student gains competence and it becomes possible to do so.

## **TEACHING EMOTION WORDS AND ASSOCIATED CONCEPTS AND STRATEGIES THROUGH SCRIPTED**

**EVERYDAY INTERACTION:** All emotion words (and concepts) can be taught using similar scripts. For example: “I think you are angry/mad....You’re angry because.... When you’re angry, here’s a smart thing to do.... There’s always something that helps” Similar scripts can be used for teaching all emotion words – not simply so that the student can recognize the emotion (in himself and others), but also so that the recognition is associated with an understanding of what causes the emotion and what to do about it.

### General Reminders About Self-Regulatory Scripts:

1. The main idea is to use words that you would like the student – at some point in the future – to use on exactly those occasions as his own self-regulatory self-talk or internal self-regulatory self-direction. You are planting self-regulation in the student’s head with these scripts.
2. Modify the language to meet individual needs. For adolescents, it is often useful to use sports metaphors and to call these self-regulatory scripts “self-coaching plays”. Other metaphors can be used as needed to make the self-regulatory self-talk motivating.
3. Pick the routines/scripts that are particularly important for a specific student or perhaps for the class as a whole. At the outset, do not use so many different scripts that the student is overwhelmed or confused.
4. Use a pleasant interactive style when using the scripts. Avoid nagging.
5. Use the scripts mainly under positive and non-stressful circumstances to create positive associations.
6. Use the scripts frequently.
7. Pull back supports as the student acquires and gradually internalizes the script.
8. Comfortably weave the scripts together as appropriate. For example, an experienced teacher might introduce a lesson using the Goal-Obstacle-Plan-Do-Review script. The Obstacle and Plan parts of the script might most effectively be accomplished using the Hard/Easy script. And during the Do part of the lesson, one or more Problem-Solving scripts might be used as problems arise. And during the Review part of the lesson, the Big Deal/Little Deal script might be used as a way of emphasizing the strategic lessons learned during the activity.

## **EVIDENCE SUPPORTING THE USE OF SELF-REGULATION INTERVENTIONS, INCLUDING SELF-REGULATORY SELF-TALK**

This summary of evidence is written for teachers and others who may be required to support their intervention practices with evidence from the research literature or who may simply be curious about the state of the evidence. This summary was written in 2007. Evidence continues to accumulate.

Evidence supporting the conclusion that self-regulation in typical child development is internalized self-regulatory self-talk is summarized by Berk (2001). Evidence supporting the role of other environmental factors (listed above) in children’s development of self-regulation is summarized by Bronson (2000). Landry and colleagues (2001, 2002, 2003) have shown that a positive and supportive maternal interactive style can facilitate development of self-regulatory/executive functions in typically developing and high risk children. Riggs and colleagues (2006) summarized the extensive evidence supporting a connection between self-regulatory/executive function development and social-emotional development as well as the limited evidence currently available that supports intervention programs specifically designed to improve executive functioning skills.

Few studies have been conducted to test the effectiveness of the self-regulatory interventions described in this tutorial specifically for students with a diagnosis of TBI. Feeney and Ylvisaker (1995, 2003, 2006, 2007) have used the Goal-Plan-Do-Review script, as well as several of the environmental “child-proofing” supports, as part of successful interventions for both young students and adolescents with self-regulatory weakness after TBI. Their nine published successful single-subject experiments showed that the

interventions resulted in reduced aggression and increased academic productivity for all nine of the students.

Laatsch and colleagues (2007) reviewed the evidence for cognitive and behavioral interventions for children with acquired brain injury. Most of the studies that targeted problem-solving or other executive function skills embedded those interventions within more comprehensive intervention plans, prohibiting an analysis of specific components. However, the authors did conclude that meta-cognitive (i.e., executive function) and cognitive-behavioral interventions can be combined with attention training to improve functioning in that domain (versus attention process training alone). Limond and Leeke (2005) similarly reviewed the research on effectiveness of intervention for children with cognitive impairments after TBI. They identified only 11 studies and concluded that there was insufficient evidence to draw strong conclusions. However, they did conclude from the available evidence that it “may be ideal to provide broadly focused rehabilitation models targeting executive function skills, everyday tasks and adaptive functioning” (p. 349).

Studies of other populations, including young adults with TBI and children and adolescents with other related disabilities, can be used with discretion as provisional support for an intervention strategy used with children with TBI. If a specific intervention strategy has been shown to be effective across several populations, including those that overlap in impairments and needs with TBI, then a cross-population inference to TBI is reasonably justified. Ultimately of course an intervention strategy is known to be effective for a specific student by carefully documenting its usefulness with that student.

In adult brain injury rehabilitation, two systematic reviews and a meta-analysis have shown compensatory strategy instruction and executive function/meta-cognitive intervention to be evidence-based practices. Cicerone and colleague (2000) identified 14 experimental intervention studies in the areas of executive functioning and problem solving (primarily class III single-subject studies). They concluded that intervention in these two domains should be considered a practice guideline for adults with TBI. More recently, Cicerone and colleagues (2005) identified an additional 9 studies (again, mainly class III single-subject studies) that reinforced their recommendation of a practice guideline. Kennedy and colleagues (2007, in press) identified 15 studies examining the effectiveness of intervention in the meta-cognitive strategy domains of problem solving, planning, and organizing. A meta-analysis was performed on the five available randomized controlled trials. Effect sizes reflecting activity/participation outcomes after meta-cognitive strategy intervention were substantially larger than chance and than control interventions. Combined with the results of the other 10 studies they reviewed, these meta-analysis results yielded the clinical recommendation that meta-cognitive strategy intervention should be used with young adults with TBI.

Perhaps the most convincing evidence supporting the use of self-regulation scripts and routines in classrooms is the large body of experimental literature on academic strategy instruction. This literature is more thoroughly reviewed in the **Tutorial on Cognitive and Learning Strategies**. This body of evidence is persuasive because it is extensive, the studies have shown positive results throughout the school years, and a wide variety of clinical and non-clinical populations have been included in the successful studies. The larger the number and variety of populations studied, the easier it becomes to generalize findings to a relatively unstudied population.

One of the well studied self-regulation focused strategy programs is worth highlighting here, namely Self-Regulated Strategy Development (SRSD). Like several other strategy intervention programs, SRSD includes several self-regulatory scripts targeting goal setting, self-instructing, self-monitoring, and self-reinforcing. More than 30 studies have validated its use with non-disabled students, high risk students, and students with a variety of disabilities, including learning disabilities, ADHD, speech and language delay, and social/emotional disturbance. Studies have spanned grades two through high school. Much of the research has been conducted in the context of writing instruction; however, SRSD procedures can be used with a variety of curricular content. Graham and Harris (2003) presented results of a meta-analysis of 18 experimental studies that yielded large to very large effect sizes across a variety of outcome measures. Meltzer and colleagues (2007) also summarized a number of classroom-based executive function procedures and cited evidence supporting their use across student populations.

Like TBI, ADHD designates a population of students with executive function/self-regulatory impairments. The ADHD intervention research literature is much larger than the TBI literature and can, therefore, be used with discretion as a guide to successful interventions for students with TBI. Zentall (2005) summarized a large number of studies demonstrating the effectiveness of environmental support and task modification procedures to increase the likelihood of successful academic performance and behavioral self-regulation for students with ADHD. (See the “child-proofing” procedures listed above.) Many of these studies are individually summarized in her 2006 book.

Of the extensively studied interventions for students with ADHD, cognitive behavior modification (CBM, Meichenbaum, 1977) most resembles the use of self-regulation scripts described in this tutorial. Early reviews and meta-analyses of the CBM studies demonstrated initial effects of the intervention, but minimal generalization and maintenance (Abikoff, 1991; Dush et al., 1989). A similarly discouraging summary was presented by Pfiffner and colleagues (2006). In contrast, a meta-analysis by Robinson and colleagues (1999) showed moderate-to-large effect sizes of the CBM interventions for adolescents, restricting the analysis to those studies of interventions that were implemented in the school settings where the problems were occurring. Similarly, Reid and colleagues (2005) completed a meta-analysis that showed moderate-to-large effect sizes for self-regulation interventions delivered in school settings. Zentall (2005) reported that the cognitive-behavioral strategies for students with ADHD found to be most successful to date are those that target self-monitoring, self-reinforcement, and self-evaluation.

A take-home lesson from the academic strategy training and ADHD literatures is that there is reason to implement self-regulation scripts within the routines of everyday life in school and at home (versus in a clinical setting) – intensively and long term – as recommended in this tutorial. That is, self-regulation interventions and supports should become a component of the culture in classrooms and homes, not just a discrete “treatment” offered in clinical settings and judged after short-term intervention trials.

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## Tutorial: Transition Routines

[See also Tutorials on [Organization](#), [Self-Regulation Routines](#)]

### WHAT IS A TRANSITION ROUTINE?

Transitions range from major transitions (e.g., the transition from high school to college or work; the transition from being single to being married) to small transitions (e.g., the transition from lunch to classroom work). Major transitions are stressful for everybody. Small transitions can be stressful for students with disability, particularly for those with impulse-control problems, organizational impairment, or other sources of inflexibility common after TBI.

Activity-to-activity transitions include ending an activity, moving from one activity to another, and beginning the new activity. Thus transition routines include the words, activities, and rituals that teachers use to bring one activity to an end, transition to the new activity, and then begin the new activity.

Transition times offer teachers and parents many excellent teaching opportunities. They can use the ending of an activity to review the activity that is ending and possibly to review the day up to that point. This review helps to consolidate memories in the student's head and also creates a habit of reviewing work that has been completed. The review also helps to prepare for the transition. Teachers and parents can use the starting routine to plan the next activity and reflect on how difficult it might be and what might be needed to get the job done well. [See Tutorial on [Self-Regulation Routines](#)]

### WHY ARE TRANSITION ROUTINES IMPORTANT FOR MANY STUDENTS AFTER TBI?

For anybody, transitions can be stressful and thus a source of behavioral disruption and cognitive disorganization. Adults without disability find major life transitions stressful and disorienting (e.g., leaving home, getting married, changing jobs). Therefore, they typically provide support for one another and create helpful rituals and other comforting routines in order to successfully negotiate difficult transitions.

Students with brain injury often have damage to the frontal lobes, resulting in both cognitive and behavioral inflexibility. Therefore even simple transitions may be difficult and stressful, such as moving from one scheduled activity to another or accepting an interruption within a familiar routine. Thus supportive transition routines are critical from the perspective of reducing stress (and the negative behaviors associated with stress) and facilitating orientation and self-regulation.

### WHAT ARE THE MAIN FEATURES OF TRANSITION ROUTINES THAT ARE IMPORTANT FOR MANY STUDENTS WITH TBI?

Well planned transition routines serve three important purposes:

1. Reduce stress and behavioral disruption: Effective transition routines make transitions less stressful and therefore prevent disruptive behavior that may occur during difficult transitions.
2. Facilitate acquisition of organizing schemes: Transition times offer adults the opportunity to teach students a variety of organizing schemes, such as the daily schedule, the activities involved in clean up, the activities involved in activity preparation, and many more. [See Tutorial on [Organization](#)]
3. Facilitate acquisition of self-regulation/executive function routines: Transition times also offer adults an opportunity to create habits of goal setting, planning, organizing, reviewing, self-evaluating, strategic

thinking, and other elements of self-regulation. [[See Tutorial on Self-Regulation/Executive Function Routines](#)]

*In summary*, transition routines not only facilitate transitions for the student. They also offer adults an opportunity to teach children how to think in an organized way, how to plan (organized thinking projected into the future), how to remember (organized thinking directed into the past), how to talk in an organized way, and how to organize their behavior to achieve their goals in a way that is consistent with the interests of others.

It is useful to think about transition routines as having three parts: What is done to bring an activity to an end; what is done to make the change, and what is done to move effectively into the next activity. When it is known in advance that students will face stressful transitions (e.g., leaving preferred activities and resuming non-preferred activities), it may be wise to discuss and practice the transition routines in advance until they are well understood and easy.

### **TERMINATION/DISENGAGEMENT ROUTINES**

Well-designed routines for ending an activity can include some of the following options, depending on the student's level of concreteness and other abilities:

1. Alert the student in advance of the ending time, to help prepare him.
2. Complete the activity in a natural and logical way, assuming that the activity is organized so that it has a logical completion (and it should have a logical completion). Completing the activity within the time frame allotted may require that the teacher or parent help with the completion.
3. Engage the student in a review of the just-completed activity: The goal, the plan, the execution, possible problems that emerged and how they were solved, the outcome, what worked and what didn't work. Possibly use objects or pictures to support this review. Throughout this review, use language (mediation) that will ideally be internalized by the student to shape his thought processes.
4. Clean up; put things away.
5. Remove the picture or symbol for that completed activity from the TO DO side of a planning board and place it in a completed category.

### **THE CHANGE ITSELF**

Well-designed routines for the change itself can include some of the following options, depending on the student's level of concreteness and other abilities:

1. Physically move from one place to another, even if technically not necessary. (Physical movement is an indicator of activity change for a concrete thinker.)
2. Give the student an object that is a symbol of change in activity (e.g., a ticket or key).
3. Somehow say goodbye – to people in the previous activity or to the activity itself. That is, make the change very explicit and complete.

### **STARTING/ENGAGEMENT ROUTINES**

Well-designed routines for beginning a new activity can include some of the following options, depending on the student's level of concreteness and other abilities:

1. Highlight the new activity on the planning board.
2. Give a general orientation to the new activity – possibly reminding the student of what was accomplished last time.

3. Set a goal and make a plan for the new activity. Physically represent this plan somehow (e.g., a clear sequence of photos or symbols or words). Use mediating language that will ideally become the student's thought process over time. **[See Tutorial on Self-Regulation, Executive Function Routines]**
4. Collaboratively create a prediction about how well the student or the group will do.
5. Collaboratively make a judgment about how much help will be needed and what kind of help.
6. Involve the student in assembling all of the needed items.

#### ROUTINES TO CHANGE ROUTINES

Students who are concrete thinkers, disorganized to some degree, and dependent on concrete routines usually have great difficulty when their routines are violated or need to be changed. Because these students are dependent on routines, they need routines to deal with changes in routines. This may sound paradoxical, but it is very important for these students.

Well-designed routines for changing routines can include some of the following options, depending on the student's level of concreteness and other abilities:

1. Discuss the change or new routine well in advance of the change.
2. Practice the new routine.
3. When the change is implemented, use behavioral momentum-building activities to help put the student in the best frame of mind for the change. **[See Tutorials on Behavior Management: Prevention Strategies; Positive Behavioral Momentum]**
4. Graphically represent the new routine (e.g., a sequence of photographs or drawings) if the student is a concrete thinker who benefits from visual sequences to guide his thinking and behavior.

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## Tutorial: Initiation

(See Tutorials on [Motivation](#), [Noncompliance](#))

### WHAT IS INITIATION?

Initiation, or starting an activity or thought process, is typically included in lists of functions that comprise a person's executive or self-regulatory system. Initiation can be accomplished either by cuing from others (e.g., when a teacher tells a student to begin working on an assignment) or by self (i.e., self-initiation). An act of self-initiation is not required when environmental events trigger a thought or action. However, when there is no such trigger or cue, an act of self-initiation is required.

A part of the brain on the dorsal (top) side of the left frontal lobe is believed to be responsible for the initiation of thoughts or activity when external cues are not present. Individuals with damage to that part of the brain experience initiation impairment or "adynamia". Students with initiation impairment may have adequate knowledge of academic and social rules, routines, and expectations, but nevertheless not act on that knowledge unless prompted by others. In cases of mild-to-moderate initiation impairment, this problem is often misdiagnosed as laziness or, in some cases, depression.

Some activities place more demands on the initiation system than others. Playing a familiar board or card game may require little initiation. Once started, the rules of the game carry the activity without requiring ongoing acts of initiation. In contrast, a conversation may place heavy demands on initiation. Unless the conversation partner continues to ask questions, it may be necessary for the person to think of new things to say and new topics, each requiring an act of initiation. Thus conversations can be stressful for individuals with initiation impairment. In working with students with initiation impairment, staff should be sensitive to the degree of initiation required by activities and should try to stay within the comfort zone of the student.

### WHY IS INITIATION IMPORTANT FOR MANY STUDENTS AFTER TBI?

Initiation impairments following TBI are due to damage to the dorsal (top) side of the frontal lobes. Because dorsal damage is less common than damage to the ventral (bottom) sides after TBI, initiation impairment is less common than inhibition impairment or impulse control problems. However, initiation problems do occur and can be troubling for the student, his friends, family, and school staff. In some cases, students may have both initiation and inhibition problems. It may be difficult to get these students started, but once started, it may be difficult for them to stop an action. **[See Tutorial on [Inhibition](#).]**

Initiation problems can be confused with laziness. One sometimes hears parents or teachers say, "He has no trouble getting started when it comes to football or video games. He's just lazy when it comes to school work." In some cases, this may be an accurate judgment. But in cases of mild-to-moderate initiation impairment, it is understandable that an initiation threshold is crossed with highly motivating activities, but not with less motivating activities. Effective management requires that the contribution of initiation impairment be acknowledged and addressed. In working with individuals with initiation impairment, staff should be sensitive to the degree of initiation required by activities and should try to stay within the comfort zone of the student.

Similarly, initiation problems can be confused with depression, another common consequence of TBI. **[See Tutorial on [Depression](#).]** Students who are relatively inactive and non-expressive may be considered depressed when the problem may rather be some degree of initiation impairment. Once again, effective management requires that the contribution of initiation impairment be acknowledged and addressed.

Other cognitive impairments can create the appearance of an initiation problem. For example, a disorganized student may remain inactive in the face of an organizationally demanding task not because of initiation problems, but rather because of organizational impairment. Similarly, a student with memory problems may not remember what to do and therefore appear to lack initiation. The same may be true of

students with problem-solving impairment. In each case, the contributing issues should be teased out using procedures presented in the hypothesis-testing sections of this web site.

## WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHO APPEAR TO LACK INITIATION?

### Understanding the Problem

As always, the first task for teachers and parents is to correctly understand the problem. As indicated above, impaired initiation can easily be misidentified as a behavior problem, an emotional problem, or a specific cognitive problem. In most cases, impaired initiation interacts with these other areas of functioning in complex ways. But it is important to recognize the role played by impaired initiation and to implement intervention and support strategies specifically designed to address the initiation component of the problem.

### Initiation and Medication

In some cases, pharmacologic interventions for other problems can reduce the student's initiation. In other cases, pharmacologic intervention (e.g., medications for depression) can be used for the initiation problem itself. If initiation is reduced as a side effect of medications, consultation with the prescribing physician might be needed to arrive at the best balance between pharmacologic effectiveness and processing efficiency.

### Accommodations and Environmental Supports

1. Well established and understood daily routines: Students with initiation impairment should thoroughly understand the sequence of activities that comprise their daily routines at home and at school. If they also have organizational or memory impairments, the daily routine should be graphically represented (e.g., a sequence of photographs, drawings, or written outline) for easy viewing and understanding. **[See Tutorial on Organization.]** The greater the routine or "automaticity" of activities, the lower the demand on the student to initiate an action.

2. Well understood instructional routines: Teachers should ensure that all components of the instructional routine are similarly well understood and as automatic as possible. **[See Tutorial on Instructional Routines]**

3. Initiation cues that are as strong as necessary while avoiding "nagging": Initiation impairment results in a need for frequent initiation cues from others. However, frequent cuing from others can result in the student perceiving that he is constantly being "nagged". This perception may in turn result in negative or oppositional student behaviors. For this reason, initiation cues should be negotiated with the student so that they are as appealing as possible. Often cues that do not involve other people are useful. For example, homework time might be signaled by a timed alarm paired with written instructions. Some students tape record their morning instructions so that morning initiation cues come from a tape recording of their own voice rather than a parent's voice that could be interpreted as nagging. A student with physical disability who has a home program of physical exercises can work with staff to create a "self-instruction exercise video" so that the home program can be completed by watching the self-instructions and self-modeling rather than having to respond to parental instructions.

4. Organizational supports: Students with initiation impairment often have organizational problems as well – or in some cases the organizational problems are a contributor to the impaired initiation. **[See Tutorial on Organization.]** These organizational problems are often more serious than they appear on the surface to be. Students with organizational problems usually benefit from advance organizational supports. Advance organizers can be as simple as a checklist or outline of a task, or a written schedule of activities to be accomplished in a given time frame. Often the advance organizer is a graphic organizer for the task (e.g., a

series of photographs that indicate the sequence of an activity; a series of boxes and connecting arrows depicting the key elements of a story and their organization). In some cases the organizer can be as explicit as a series of photos of the student moving through the steps of the task.

5. Ongoing monitoring of student activity: It is easy to assume that students will continue an activity that they have begun (e.g., homework) until the task is completed. However, students with initiation impairment may stop at transition points in the task (e.g., when completing homework, stopping after one page of math problems is completed). These students often require another initiation cue to continue the task to completion. Teachers and parents should frequently check to see that the students are continuing to work on their tasks to completion.

6. Activities that require minimal initiation: For students with initiation impairment, activities that require ongoing initiation can be difficult and stressful. For example, casual conversation often requires ongoing topic initiation; thus students with initiation impairment find such conversations stressful. At the other extreme, activities that present few initiation demands are easier and less stressful. For example, once begun, a familiar board game proceeds on its own momentum, with each move being a trigger for the next. Staff and family should try to make judgments about the initiation demands of activities and engage the student in as many low initiation demand activities as possible.

7. Peer support: Students with initiation impairment sometimes benefit from being paired with peer buddies who can assume responsibility for the initiation demands of their activities.

#### Interventions for the Student

If the initiation problem is a consequence of damage to specific initiation centers in the left frontal lobe, there are no specific training program designed to improve initiation across all domains of activity. Addressing other cognitive problems and using compensatory approaches are usually indicated:

1. Other primary problems: If initiation is weak because of attention problems, organization problems, memory problems, or other cognitive problems, staff and family should use intervention and support procedures that target the underlying problem. **[See Tutorials on Attention, Organization, Memory.]**

2. Automatic routines: As routines become more and more automatic, the impact of initiation problems can be minimized.. Thus there is a great advantage in automatizing routines for individuals with initiation impairment. This includes routines of everyday living at home, instructional routines at school, social routines, and the like.

3. Request for help: Students with initiation impairment should be taught to advocate for themselves by saying, with confidence and comfort, words like “Could you get me started on \_\_\_\_\_ at such and such a time”.

4. Start early: Like students who process information slowly and work slowly, students with initiation impairment should create a habit of starting assignments and projects early so that they do not get rushed for time.

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## Tutorial: Cognitive Egocentrism Theory Of Mind

(See Tutorials on [Social Perception](#); [Social Competence](#); [Friendship and Peer Acceptance](#))

### WHAT ARE EGOCENTRISM AND THEORY OF MIND?

Egocentrism is often understood as a moral concept: morally egocentric people regard their own thoughts and needs as most important and willfully fail to account for the needs and intentions of others in making their decisions about how to act. Quite distinct from this moral concept is egocentrism as a cognitive limitation: people with cognitive egocentrism have neurologically-based difficulty "reading" others' mental states and considering events from another person's perspective. In this sense, toddlers and young preschoolers are egocentric in that they lack the cognitive resources to see the world from alternative perspectives, but saying that they are egocentric is not a moral judgment. The same can be said about older children and adults with brain injury related egocentrism: their difficulty perceiving the world from alternative perspectives is a cognitive impairment, not a moral failing.

In recent years, themes related to cognitive egocentrism have increasingly been discussed under the concept of *theory of mind*. To say that a person has a fully developed theory of mind is to say at least the following:

1. She knows that she and other people have minds, that is they have thoughts, beliefs, feelings, desires, intentions, and the like.
2. She is able to understand her own thoughts and feelings, and infer other people's thoughts, beliefs, feelings, desires, and intentions from their behavior (including what they say) with reasonable accuracy.
3. She is disposed to use this information about other people's thoughts, beliefs, feelings, desires, and intentions in making decisions about how to act in social contexts. In particular, she is able to see the world from the perspective of other people.

Discussions of theory of mind have centered around autism as a disability population; however, controversies persist about the centrality of theory of mind in understanding autism.

### Development of Theory of Mind

Theory of mind develops slowly in childhood, beginning in infancy when infants become aware that people, but not inanimate objects, are worth sending messages to. Infants interact reciprocally with adults, jointly attend to the same objects and events, associate facial expression with emotion, and imitate the behavior of others. All of these behaviors indicate early development of their theory of mind.

Toddlers and young preschoolers slowly come to be able to understand their own mental states and interpret mental states of others (e.g., happy versus sad versus angry), and modify their own behavior in response to these interpretations. However, theory of mind (egocentric) mistakes continue to be common, as when a father asks his two year old on the telephone, "Where's your mom?" and the two year old points to her mom, not recognizing that her dad at the other end of the phone line will not benefit from her pointing.

Theory of mind development (i.e., moving beyond cognitive egocentrism) is gradual and continues into the adult years. Even mature adults often make theory of mind errors, for example mistaking a subtle satiric comment for an insult because of inadequate attention to subtle cues, such as a twinkle in the eye of the conversation partner. Typically developing adolescents are famous for a peculiar and serious theory of mind error, namely believing that people around them, especially peers, are thinking about and making judgements about them when in fact there may be no such thoughts or judgments and no evidence that those judgments are being made. Even mature adults may have difficulty understanding and appreciating the perspective of others when those others hold opposing views on religious, political, or other sensitive topics.



Developments in the domains of social perception, empathy, reciprocal emotional bonds of friendship, and self-awareness are all closely related to development of theory of mind. Without the ability to “read” ones own and others’ mental states, it is hard to empathize with others or engage in related behaviors characteristic of friendship. The clinical population most often singled out in discussions of impaired theory of mind is autism. In recent years, researchers have also shown that TBI can produce impaired theory of mind and related social perception deficits as well.

Neuropsychological studies of theory of mind phenomena have isolated specific areas of the brain that tend to be activated when thinking specifically about persons or when perceiving and interpreting social messages in others’ verbal and nonverbal interaction. These areas notably include medial prefrontal cortex, both ventral (bottom) and dorsal (top)(including the anterior cingulate gyrus), the amygdala, the temporal lobe poles, and the junction between the temporal and parietal lobe in the right hemisphere. Some of these areas of the brain are vulnerable in TBI.

### **WHY IS COGNITIVE EGOCENTRISM/IMPAIRED THEORY OF MIND IMPORTANT FOR MANY STUDENTS AFTER TBI?**

As stated above, areas of the brain that are vulnerable in TBI include some of the areas associated with impaired theory of mind (or cognitive egocentrism) phenomena. Children and adults with TBI often show symptoms of cognitive egocentrism: their difficulty perceiving the world from alternative perspectives is a cognitive impairment, not a moral failing. While it is rare for students with TBI to demonstrate symptoms as severe as those seen in many students with autism, more subtle forms of cognitive egocentrism are commonly observed. For example, it is rare for a student with TBI to treat other humans as objects (sometimes seen in autism); however, it is common for the student with TBI to have difficulty understanding why others can engage in activities that are prohibited for him.

Even more common are difficulties interpreting others’ words and behavior correctly. For example, a student with TBI might interpret good natured teasing as an insult, or a friendly comment from a member of the opposite sex as an invitation. Misinterpretations of this sort – “misreadings” of others’ intent – interfere with social relationships, including friendship. Many students with TBI state that their most troubling problem after the injury is social isolation and the absence of good friends. Cognitive egocentrism is a contributor to this problem in many cases.

Quite separate from cognitive egocentrism as a neurologic impairment is the “self-centeredness” that is naturally associated with any crisis in life. When seriously ill or injured, most people tend to focus on themselves and their own needs and not those of others. Furthermore, the family focus on the injured member tends to increase this self-focus. Because TBI can be an ongoing crisis in the lives of the student with TBI and her family, some degree of self-centeredness is therefore understandable. Nevertheless, efforts should be made to help the student correctly “read” others’ intent and focus on others’ needs because this is critically important in developing satisfying social relationships. **(See Tutorial on Social Perception.)**

Two distinct dynamics that can lead to a downward spiral of egocentrism. First, environmental factors (e.g., the intense focus on the child) and neurologic egocentrism can interact to heighten the phenomenon. Second, negative misreadings of others’ behavior can lead to their negative reactions which then leads to additionally negative and exaggerated misreadings of their behavior. Thus, egocentrism is an important issue for many students with TBI.

## **WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHO ARE EGOCENTRIC AND/OR SEEM TO HAVE A POORLY DEVELOPED THEORY OF MIND?**

### Understanding the problem

As always, the first task for teachers and parents is to correctly understand the problem. Symptoms of cognitive egocentrism can easily be misidentified as moral egocentrism, which naturally elicits a negative response from others. Or cognitive egocentrism may be misunderstood as a lack of social knowledge or of social skills, followed by inaccurately chosen packages of social skills training. Conversely, cognitive and self-regulatory problems, such as impulsiveness and initiation impairment, can be misidentified as egocentrism. Similarly, emotional problems, such as depression or anxiety disorder, can be misidentified as egocentrism. Therefore, efforts to sort out the relative contributions of these potential contributors to the perceived problem may be required.

When cognitive egocentrism is found to be a contributor to the student's difficulties with social interaction and relationships, its role must be recognized and relevant intervention and support strategies designed and implemented.

### Environmental Strategies

Success in social interaction for students with cognitive egocentrism difficulties may require environmental supports, such as the following.

**Competent and Sensitive Social Partners:** For students with cognitive egocentrism, it is critical to have knowledgeable, understanding, and competent communication partners who therefore do not misinterpret and react punitively to neurologically based awkward behaviors that result from misreading social cues or failing to account for the needs of others. In addition, competent social communication partners take their interaction with students with TBI as an opportunity to highlight "mind reading" in the interactions, that is explicitly interpreting the thoughts and feelings of others (e.g., "Did you see the look on his face? That told me that he was just kidding"). Therefore education and training for everyday communication partners, including peers, family members, and school staff, may be critical to social success.

**Explicit Clues to Partners' Mental States:** As with social perception impairment, interactions with students with cognitive egocentrism may need to include explicit statements about communication partners' mental states. For example, a communication partner may need to say "Let me tell you a joke..." rather than just telling the joke; or the communication partner may routinely add "Just kidding" after a tease rather than leaving it up to the student with social perception impairment to figure out that it is teasing. In these and other ways, communication partners explicitly make their mental states known to the student with cognitive egocentrism or theory of mind deficits.

### **Instructional Strategies to Assist Students with Cognitive Egocentrism/Theory of Mind Impairment (See Tutorial on [Social Perception](#).)**

**Context-Sensitive Social Perception Training:** Social perception training and coaching can occur as the adult discusses the student's inner life, the adult's own inner life, and the inner lives of others. A first step in perceiving others' mental states is to accurately perceive one's own inner states. For example, young children need to be able to perceive whether they are happy, sad, mad, or scared (the four earliest identified emotional states) and then use available evidence to make judgments about others' mental states. Adults can identify the state that the child is in and say why they think so (e.g., "You're smiling and jumping around; I think you must be happy"; "You're crying; you must be very sad about something; let me give you a big hug").

The same judgments along with the evidence can be made by the adult about the adult's mental state or about others' mental states. For example, "As you can tell by looking at my face, I am upset. I am upset because ..... So please ....." The point is to attach words to mental states, and to associate the mental state words with evidence that the person is in such a state, the reason for being in such a state, and what to do about it. For older children and adolescents, the inner state words can be progressively more refined and abstract (e.g., jealous, resentful, excited, ambitious, etc).

Sometimes this training is done in therapy sessions, using photos or videos of people to illustrate emotion words. Decontextualized training is not as effective as actual situational coaching because of problems with transfer of training. (See Tutorial on Transfer.) However, decontextualized presentation of this sort may be useful at the beginning of the intervention in order to explain the problems a student is having understanding mental-state language.

**Practice During Book Reading and Dinner Time Conversations:** With young children, practice of this sort can be ideally implemented during evening book reading time. For older children, dinner time conversations are an ideal time to talk about daily events and explore the mental lives of people, their beliefs, emotions, desires, motivations, and the like. For example, description of a daily event in the student's day might include parental queries like, "I wonder what you were (or he was) feeling at the time.... I wonder why you were (he was) feeling that way.... I wonder if there is something else that you (he) might have done about that...."

**Risk of Error in Attempting to Read Other's Mental States:** It is important that these conversations about inner states (e.g., emotions, feelings, thoughts, beliefs, desires, etc.) emphasize the ease with which one can misperceive others' true feelings, intentions, motivations, and the like. In this case, the targeted script for the child is, "Do I know what he is feeling or thinking?" Younger and older children alike can be trained to ask others what they are thinking or feeling, rather than relying on their fallible perception and inference.

**Requesting Verification: "Am I right?":** When students know that they are frequently mistaken in their readings of others' mental states, it may be important for them to get into the habit of requesting validation. For example, the student may be taught to say, "You seem angry about something; am I right about that?"

### **Learning to be a successful actor in a world that is poorly understood**

Individuals with impaired theory of mind may never acquire the "savvy" needed to easily read others' mental states. They may not understand why others find certain jokes funny, insults upsetting, and compliments uplifting. They may not understand why certain behaviors are socially expected and others forbidden.

Nevertheless, these students may learn to be a successful actor in this world that they lack a "gut-level" understanding of. They can learn to tell jokes that others consider funny, offer compliments that others find uplifting, and avoid insults that upset others. It may be helpful for adults to think of their job as being much like that of a person who trains actors. Students with theory of mind impairment need to learn many roles, the scripts that go with those roles, and why those roles and scripts are important. This requires a great deal of context-sensitive coaching in these roles and scripts.

One of the social interventions for young children with autism, Carol Gray's "Social Stories", offers a useful approach to theory of mind problems that can be useful also for young students with similar problems after TBI. Ideally social stories are written with or at least customized for the child. They should be short and to the point, focusing on a specific social difficulty faced by the child. The story is comprised of sentences, some of which describe the situation (descriptive sentences), others offer the perspective of social partners (perspective sentences), and one or two at the end state a successful course of action (directive sentences). Reading the social stories should have the same warm and comfortable context as parent-child joint book reading and, like parent-child book reading, the same story should be read several times.

A conceptually similar approach that has been used with adolescents is called “self-coaching” to capitalize on a potentially attractive sports metaphor. The student with impaired theory of mind is taught “plays” that are called under specific social conditions. The play includes the conditions under which it is called (analogous to the descriptive sentences of social stories), the reason for the play (analogous to perspective sentences), and the actions that the play calls for (analogous to the directive sentences). Ideally there is a close analogy with a play from a sport familiar to the student. To heighten its attractiveness, the social play might even be given the same name as the play in sports or be named after a heroic sports figure.

For example, the effort needed to read others’ intentions could be named the “Payton Manning Play” after the quarterback for the Indianapolis Colts who is famous for reading the opponent’s defense at the line of scrimmage and then changing his team’s play as a result of this reading.

Conversational scripts:

Connected with the theme of “being an actor in a world that is poorly understood” is the need for conversational scripts. Conversational competence requires considerable “mind reading” – knowing what others are interested in, for topic initiation, and knowing how others might make connections, for topic maintenance. This is an area of special weakness for students with cognitive egocentrism. Therefore, they might need to learn a small set of conversation starter scripts (e.g., “How’s your day going?”; “Do you have any tests or projects coming up?”; “Are you doing anything fun this weekend?”) and conversation maintenance scripts (e.g., “Are you ready for the test?”; “Was your trip fun? What did you do there?”). These scripts are designed to get inside the conversation partner’s head as opposed to restricting conversation to one’s own interests, which is the tendency of students with cognitive egocentrism. As always, real-world coaching is critical because of problems with transfer of training from a training context to a functional application context. **(See Tutorial on Transfer of Training.)**

Turning the tables: Helping students with impaired theory of mind to help others:

One of the most helpful procedures for students with cognitive egocentrism is to engage them in the process of helping others. For example, a speech-language or social work therapy group might develop a project designed to create materials that could help other students with social skills deficits. In the process of creating the materials, the students necessarily process a great deal of perspective taking: Why is this student having these difficulties? How will others react? Why? How could the first student have known that the others would react in that way? What could the first student do about it? How will that be received by the others? Why? And so on.

In these projects, the students with cognitive egocentrism are in effect declared experts in their greatest area of deficit, but acquire competence as they create their intended product. These project-oriented activities can be engaging and fun while also teaching important perspective taking and “mind reading” competencies. **(See Tutorial on Project-Oriented Intervention.)**

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## Tutorial: PERSEVERATION

(See also Tutorials on [Flexibility](#), [Self-Regulation/Executive Function Routines](#), [Organization](#), [Anxiety](#))

### WHAT IS PERSEVERATION?

Perseveration is the uncontrolled repetition or continuation of a response (e.g., behavior, word, thought, activity, strategy, or emotion) in the absence of an ongoing occasion or rationale for that behavior or emotion (e.g., the topic or task requirements have changed). Perseverative behavior generally interferes with learning and adaptive behavior (e.g., effective interaction, on-task behavior, flexible shifting among topics and activities), and is believed to result from neurologic impairment.

Some authorities distinguish among three types of perseveration: (1) *Stuck-in-set perseveration*, which is the uncontrolled and extended maintenance of a thought, activity, emotion, problem-solving strategy, or topic in conversation; (2) *Recurrent perseveration*, which is the uncontrolled repetition or recurrence of a word or phrase when it no longer contributes to meaning; (3) *Continuous perseveration*, which is the uncontrolled and uninterrupted repetition of a behavior (e.g., motor act) beyond its usefulness.

The most common type of perseveration after TBI is stuck-in-set perseveration, associated with damage to the frontal lobes. For example, a student may begin discussing a topic and then have difficulty moving on to a new topic. Or he may return repeatedly to certain favored topics or activities more frequently than would be expected of a person who simply is interested in that topic or activity. Or the student may persist with a strategy to solve a problem beyond the point at which it ought to be clear that the strategy is not working. Or the student may experience an emotion (e.g., anger) beyond the time when it would be expected that he could move on. And the student may become upset when asked to give up the perseverative activity, topic, strategy, or emotion. Perseverative recurrence of words (i.e., recurrent perseveration), in contrast, is commonly observed in individuals with aphasia, which is less common after TBI.

Perseveration is often, but not invariably, associated with other neurologic impairments. For example, perseveration may be associated with generally impaired inhibition or impulse control, although the two do not always occur together. (See Tutorial on [Inhibition](#).) Similarly perseveration may be associated with impaired self-monitoring or inadequate responses to feedback, although again these do not always occur together. (See Tutorial on [Self-Monitoring](#).) Perseveration may also be associated with general inflexibility in thinking and acting. (See Tutorials on [Flexibility](#); [Transition Routines](#).) In some students, perseveration may be a response to anxiety. (See Tutorial on [Anxiety](#).) Perseveration may also be associated with memory impairments in some students. (See Tutorial on [Memory and Memory Problems](#).) Finally, perseveration may be associated with a restricted set of interests that dominate activities and conversation. A student who perseverates may enjoy the perseverative activity or topic; alternatively, he may be upset by his inability to shift topics or transition to a new task.

Perseverative behaviors are generally considered maladaptive and non-productive. When difficulties making transitions, shifting topics or thoughts, or moving on from an emotional state become so extreme that they interfere with everyday functioning, then the student's perseveration is clinically significant. However, it is important to remember that there is a fine line between perseverative behavior that serves no apparent purpose and the extreme perseverance of many highly successful professionals in technology and other fields.

### WHY IS PERSEVERATION IMPORTANT FOR MANY STUDENTS AFTER TBI?

Students with TBI or other neurological conditions sometimes demonstrate extreme forms of rigidity, inflexibility, and stuck-in-set perseveration. Early in recovery, continuous perseveration may also be observed, for example continuing a suckle or munch pattern in eating after the food has been swallowed. Recurrent perseveration may also be observed, associated with aphasia that may be a feature of early recovery, but later become less prominent or resolve completely.

Perseveration (and associated inflexibility) is often associated with damage to the frontal lobes, the most common site of injury in TBI. Therefore, some degree of perseveration is common in students with TBI, even months and years after the injury. Perseveration may manifest itself as difficulty (1) making transitions during the school day (e.g., from lunch or gym back to classroom work), (2) tolerating changes in schedules or everyday routines, (3) adjusting to changes in staff, (4) ending an intense emotional feeling, (5) changing topics of conversation, (6) complying with requests to stop favored activities, and the like. In extreme cases, a transition as apparently simple as going from sitting to standing may be difficult and cause stress.

Because the frontal lobes develop slowly and continue their development throughout adolescence, perseveration may first be noticed as a problem long after the injury in a young child. That is, as demands for flexibility and self-regulation increase over time and developmental stages, the child with damage to the frontal lobes may not be able to keep up with these demands. Perseveration is also observed in developmental disorders like autism spectrum disorders (including Asperger's syndrome and high functioning autism), obsessive-compulsive disorder, Tourette's syndrome, schizophrenia, and others.

In some cases, stuck-in-set perseveration is an indirect rather than a direct result of neurological impairment. That is, if underlying cognitive or academic impairments make school tasks difficult, the student's anxiety about these tasks may lead to stuck-in-set perseveration on more comfortable tasks.

It is less common for students with TBI to experience persistent recurrent perseveration, associated with damage to the language zones of the left hemisphere. Similarly it is relatively uncommon for students with TBI to experience persistent continuous perseveration, associated with damage to the right hemisphere or basal ganglia.

## **WHAT ARE THE MAIN THEMES IN INSTRUCTION AND SUPPORT FOR STUDENTS WHO PERSEVERATE (See also Tutorials on [Flexibility](#), [Transition Routines](#); [Self-Regulation/Executive Function Routines](#); [Organization](#); [Self-Monitoring](#); [Anxiety](#))**

### Understanding the Problem

In every domain of functioning, step one is to understand the student and his or her strengths and needs. In the case of students who perseverate, understanding is critical. In the absence of this understanding, staff and family will inevitably become frustrated and impatient with the student when he does not let go of topics or emotions or behaviors. For example, it is easy to see the behavior as strictly "behavioral" (i.e., willful) when it may be that the student has considerable difficulty controlling the perseveration as a result of neurological impairment.

Similarly it is critical for adults to distinguish between perseveration as a neurological symptom, on the one hand, and extreme interest in a topic or extreme persistence on the other hand. When students persist beyond normal expectations in trying to solve a problem or complete a puzzle or the like, it may be a result of praiseworthy persistence, not neurologically based perseveration. Similarly extreme interest in a specific topic or activity may or may not be a symptom of perseveration. Good judgment on the part of adults is always required. The problem-solving (hypothesis-testing) strategies described on this web site may be useful in sorting this out.

### Pharmacologic Intervention

Medications are occasionally used for students with TBI (or other disability) who have problems with perseveration. This is particularly the case if perseveration is caused in part by anxiety. Because treatment with medication can be complicated by brain injury, parents and teachers should ensure that the prescribing physician has experience with children with brain injury. Furthermore, a systematic procedure must be in place to monitor the effectiveness of the medication, its dose, and possible side effects.

Environmental and student interventions add to the effect of medications. In some students, the focusing or calming effect of the medication increases the likelihood that environmental and behavioral interventions will be effective.

## Environmental Accommodations and Supports

Adult understanding of the student's abilities and neurological impairments should lead naturally to a set of environmental accommodations and supports. That is, environmental factors (including cues and other support behaviors of people in the environment) should be organized with the goal of preventing, redirecting, and reducing perseveration while optimizing the student's successful learning and self-management. Not all students respond to the same types of environmental management. It may require some experimentation to identify the sorts of procedures that work best. Although a distinction is drawn below between environmental management and student training, it is possible that environmental changes will also result in improvements in the student's functioning. Ideally the student will gradually come to have greater self-regulation of perseverative behaviors so that environmental supports can be reduced over time.

1. Expectations: Step one in environmental management is to ensure that education staff and family members have appropriate expectations regarding the student's abilities and needs. Some students with significant impairments have great difficulty controlling perseveration and should not be expected to control their own perseverative tendencies nor should they be expected to respond quickly and consistently to the environmental strategies listed below. An extended period of experimentation with environmental procedures may be needed to determine which procedures are most effective and how serious the student's perseveration is. If expectations for self-regulation are too high, the student and adults will be frustrated and behavioral difficulties are a predictable consequence.

Other students may be expected to exercise some control over their perseveration and should be expected to do so. If expectations for self-regulation are too low and environmental supports too intensive, the predictable consequence is learned helplessness in the student. In all cases, environmental supports should be systematically reduced as the student gains greater internal control over perseverative tendencies.

2. Prevention: If there are specific topics or activities that predictably evoke the student's perseverative behavior (e.g., coloring activities or talk about dinosaurs or specific video games), then it may be best to try to avoid these topics and activities, thereby preventing the perseveration. This is particularly true in school when shifts to less desirable activities are required.

3. Reassurance as Prevention: If relevant adults believe that the student's perseveration is based on underlying anxiety about an issue, it may be useful to anticipate the student's anxiety, offer intense reassurance, and then move on. Caution must be exercised, however, because this focus on the perseverative content may simply increase the anxiety and associated perseveration. For example, if a student is concerned about an upcoming transition and adults choose to initiate a discussion about the transition and offer reassurance, their initiation of the topic may trigger the student's perseveration on that topic. A period of experimentation may be necessary.

4. Redirection: Redirection is the most common environmental strategy used in managing perseveration. It may take the form of changing the subject, starting a new activity, moving to a different place, giving the student a new job, placing an object (e.g., a key) in the student's hand as a cue to move on, and the like. However, adults should be careful to avoid using highly desirable activities as the key to redirection (e.g., redirecting the student from a perseverative topic by allowing him to play a desirable video game). The student may then learn to use perseveration as a means to acquire the more desirable activity. It may be useful to brainstorm with the student about useful redirection procedures.

5. Setting Limits: In some cases it is useful to set a limit to the perseverative activity and then insist on an end to the activity or redirect the student. For example, a teacher may say "You may ask that question only once more" to a student who is repeatedly asking the same question. Some teachers and parents give the

child one or two tickets for a perseverative topic or activity and when the tickets are gone, the topic or activity is no longer allowed. Similarly time limits may be placed on perseverative activities. Limit setting of this sort is only useful for students who have the cognitive ability to understand the limits and to benefit from the perseveration becoming a deliberate focus of attention. Similarly, the student must have the self-regulatory ability to be positively influenced by the limit setting.

6. **Dramatic Termination:** In some cases it may be useful to dramatically end a topic or activity. For example, the adult might write the name of the topic on a card and then rip up the card and throw it away while saying, “We are done with that; it’s over; no more; that topic is gone!” and then move on to a new activity or topic. This procedure may ultimately be turned over to the student. As with reassurance, such dramatic terminations may result in the opposite of the intended consequence if they heighten the student’s focus on the content of the perseveration. Again, a period of experimentation may be necessary.

7. **Gradually Modifying the Activity:** One possibility for students who perseverate on specific activities is for adults to enter the activity with the student and gradually add additional elements of meaning to the activity, use the activity to teach relevant concepts, and the like. In this way, perseverative activities are used as a context to teach new content. For example, a student who perseverates on puzzles may learn number concepts or color concepts or problem-solving strategies while engaged in that perseverative activity.

8. **Ignoring:** On the assumption that the perseverative behavior is motivated in part by the student’s desire to gain attention or other positive response from adults or peers, simply ignoring the behavior may be the best option. However, ignoring the perseveration will not help if it is neurological rather than “behavioral” (i.e., motivated by and maintained by its consequences). In fact, ignoring perseveration often increases the problem.

9. **Providing Support for Difficult Tasks:** In some cases, a student might perseverate on a desirable and doable task in order to avoid a difficult task that creates anxiety. In this case, it is important to let the student know that help is available to complete the difficult task successfully.

10. **Peer Support and Peer Understanding:** When perseverative behavior affects peers in a negative way, it is often useful to provide them with basic information about the nature of the perseverating student’s difficulty. The goal is to help the peers understand that the student is not being intentionally irritating and that it is sometimes very difficult for him to stop his behaviors. When it is known in advance that there is a strong likelihood that a student will perseverate, it may be well to pair the perseverative student with a peer who can help him prevent or terminate the perseveration. Adults should be sensitive in choosing peers for this role and in training them.

11. **Systematic Reduction of Supports:** As with all support-oriented intervention plans, supports should be systematically reduced as it becomes possible to do so. This includes the support provided by parents, teachers, and assistants. In addition, self-management strategies (see below) should be introduced as soon as possible, sensitive to the student’s cognitive level and self-regulatory capacity.

## Student Interventions

Beyond understanding the nature of the problem and providing environmental supports, the following intervention procedures may be helpful. Interventions that are directed at improving the student’s deliberate control over perseveration should be consistent with a more general approach to improving self-regulatory functions. These interventions often begin by asking the student to describe the problem and its effects, and then brainstorming with the student about possible strategies or plans to reduce the frequency of the problem behavior. Please **see the tutorial on [Self-Regulation/Executive Function Routines](#)**.

1. **Teaching Alternative Behaviors:** If perseverative behavior is found to be “behavioral” (i.e., willful), it may be useful to teach communication alternatives to the perseveration. For example, if the student uses perseveration on a desirable activity to avoid a difficult task, the alternative may be that the student will



request help or ask for a break before beginning the more difficult task. Please see the Tutorial on Teaching Positive Communication Alternatives to Negative Behavior. Extensive modeling of the alternative behavior and practice are components of this intervention.

## 2. Teaching the Student to Recognize and Control Perseveration:

3a. Self-Monitoring: Some students who perseverate do not recognize their own perseveration or its effects on others. In some cases, it is useful to video tape the student engaged in perseverative behavior and invite her to view herself, with the goal of identifying and monitoring her perseveration. In many cases, sensitivity to the student's self-image mandates that the actor in these videos be somebody other than the student. Once the student is capable of identifying perseverative behavior, cues can be provided that enable her to monitor the behavior in everyday activities. A video can also be made in which the student models for herself one or more of the strategies that are useful in breaking a perseverative set.

3b. Creation of a "Routine to Change Routines": Some students who are inflexible and perseverate benefit from a specific routine that they and the adult use as a mantra as they try to deal with change or terminate a perseverative activity. **Please see the Tutorials on Transition Routines and Self-Regulation/Executive Function Routines.**

3b. Self-Prevention: Some students can be taught to prevent perseveration by reminding themselves to avoid topics or activities that elicit perseveration. For example, the student's self-talk might be, "No video games until after school."

3c. Self-Reassurance: If perseveration is related to anxiety, some students can be taught to give themselves reassurance and in this way avoid perseverating on the anxiety-producing topic. Having a clear plan to break a perseverative set can be a component of this reassurance. For example, if perseveration is triggered by anxiety-provoking concerns about an upcoming event, the plan may be to self-talk: "I know that I can talk to my mother about this after school. It will be OK; I have a plan. I can move on." The student needs to know that there is a strategy that works for her.

3d. Self-Redirection, Self-Limit Setting, Self-Termination: Similarly, some students can be given gradually increasing responsibility for recognizing their perseveration, and then redirecting themselves, setting limits, and/or terminating the perseveration in some dramatic manner. See above for details.

3e. Requests for Help: Students who can identify and monitor their own perseveration but are not currently able to end it themselves may nevertheless be taught to ask for help in ending the perseveration. In this way they gradually increase their participation in ending the perseverative activity. For examples, the student's self-talk might be, "I'm stuck; I need help moving on."

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