

SELF-REGULATION/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.