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 do-able 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 engaging 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 students self-talk might be, "I'm stuck; I need help moving on."

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