

Case Study: An Innovative Technology for Individuals with Autism Spectrum Disorders

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Aug 1, 2005

URL: <http://www.techlearning.com/story/showArticle.jhtml?articleID=165700658>

CASE STUDIES:

Charles

“Charles” is a student diagnosed with Autism and is presently in a self-contained classroom for children with Autism. His brother is diagnosed with AD/HD. Charles’ parents were considering Play Attention for his brother and inquired if Charles might benefit from the program. Because of my previous use of Play Attention, I knew it was possible to increase his ability to attend and decrease his impulsive behaviors. While this program had not been used for children or adults with Autism at the time, I was hopeful that there would be beneficial results as Charles was experiencing attention difficulties and behavioral problems. Furthermore, I knew that I would have to develop strategies and particular teaching methods to accommodate Charles’ special needs.

Charles started Play Attention with me. I set goals to assist Charles in controlling or extinguishing particular behaviors as he often displayed aggression toward others and become easily frustrated or angry. He also became extremely loud and was unable to perform the desired skill or task in a variety of settings, including school, home, and in the community. These skills were often simple tasks, such as washing his hands for lunch.

Charles’ favorite activity is a Play Attention game called Tower Builder, which strengthens time on-task. When Charles focuses on a block in the lower left side of the computer screen, he can actually pick it up and move it to the other side of the screen by his mind alone! He can build an entire tower like this. If he falls off-task, the block will move the wrong way. I utilized his success with Tower Builder to generalize physical relaxation and calmness. When he displayed behaviors, such as frustration at being unable to complete a task or anger at not being first, I instructed his teacher and parents to request him to calm down and remember Tower Builder. When given this simple instruction, the adult could literally see Charles’ body calm down. He was then asked to retry the desired task and was able to perform the task at hand. By repeating this process, Charles has reduced his aggressive actions from several times a day to a point where they are rarely observable. We had achieved generalization and transfer through voice prompting. Specifically, a side benefit was to actually increase Charles’ time on-task

skills. Initially, Charles was unable to independently attend to tasks for more than a three-minute period. With strategic work emphasizing on-task training, he is now able to attend to school-related academic tasks independently for up to twenty minutes.

Charles also had aggressive competitive issues. He was very competitive in all areas of his life. If he wasn't first in line for lunch, winner of the game, etc., he became angry and defiant. Helping him to understand how he could compete with his own behaviors and "beat" the computer when performing the games enabled me to assist him in overcoming some of his competitive issues in the classroom and community settings.

Using Tower Builder (time-on-task component), the student must focus to build a tower of different levels in a specified amount of time. When Charles paid attention he could 'beat the computer' by finishing the task before the allotted time, but when he displayed negative behaviors he was unable to 'win.' On several occasions Charles would not beat the computer, which in turn would foster inappropriate behaviors. His frustration and inappropriate behaviors would then carry over into the next task. This gave me the opportunity to address the issues of winning and losing and the effects his inappropriate behaviors had on his ability to perform the task. Since control, relaxation, and focus were the only way Charles could 'beat the computer,' I was able to guide him to understand the cause/effect relationship between his negative behaviors and his ability to perform simple tasks. I always reassured him that as long as he was in control of his behavior and did his best he would always be a winner!

Task completion was also a problem for Charles. When he began Play Attention, he would exhibit frustration and anger when he could not complete an activity. I viewed these times as teachable moments. Charles noticed that the games performed best when he was calm and relaxed. When he deviated from this physiological state by becoming angry or frustrated, I would instruct Charles to calm down and begin to rub his back. Charles would calm down and regain control of the task on the computer. He began to equate relaxation and personal control to success.

To insure transfer and generalization, I related the performance to his brain working and not working; he identified 'brain working' to relaxation, control, and calmness. He identified 'brain not working' to frustration and anger. In other words, his correlation between the brain working and not working was a concept Charles could comprehend in relation to his ability to successfully complete each task. At this point, I would ask him to feel how his body felt and instruct him to visually notice the changes in his ability to complete the task on the computer. Charles became cognitively aware when his brain was 'not working' and when his brain was 'working.' When he began to easily settle himself at my prompting, he stated, "Now my brain can work!" We experienced these remarkable behavioral successes in approximately two months (about fifteen sessions). Realistically, we would have to practice this for weeks and perhaps months for Charles to retain his ability to self-regulate.

Play Attention charts impulsivity during game play. Game information is immediately displayed at the conclusion of a game. We related his vast amount of impulsive strikes to

his lowered game scores. He began to notice the correlation. When first beginning Play Attention he would have as many as sixty impulsive hits during a five-minute activity. Currently, on many attempts, he has zero impulsive hits. We worked on associating calm control over impulsivity with success. Through discussion and classroom reinforcement, his improvement in impulsivity has generalized into his classroom behaviors. He has diminished loud outbursts, aggression, and inappropriate reactions to various situations to a minimal level in the school setting. Charles is now able to interact in community settings with very little inappropriate outbursts or frustrations, including waiting in line for his food in a restaurant setting.

Play Attention requires visual attention to its games. Through this feature, Charles developed the ability to make limited eye contact. Before beginning Play Attention, Charles was unable to make eye contact or even gaze in the direction of the person he was conversing with. Although he is still unable to maintain eye contact for sustained periods of time, he is now able to attend to the eyes for a short period of time and the speaker's mouth for the period of the conversation. This has helped to improve his conversational speech. He is now able to comprehend what is being said to him due to his sustained attention and appropriately respond in a proper turn-taking conversation. His ability to respond to questions has progressed from mimicking the question, responding yes or no, to complete sentences in a proper response.

Charles' reading abilities have progressed as well. During reading instruction when he became frustrated, didn't focus, or became impulsive, I reminded him about the various tasks on Play Attention and how his brain works. This assisted in his ability to increase focus during reading instruction. The achievement gained in Charles' reading abilities occurred due to his sustained attention, reduction in impulsivity, and increased positive behaviors. When giving directions to children or adults with AD/HD and Autism, many times they only process or remember the first or last part of the direction. Charles' impulsivity, negative behaviors, and his lack of ability to focus interfered with his ability to attend to the whole word or read all of simple text in a sentence. He would automatically state a word that he knew started with the first letter or would look at the picture and create his own sentence. With his decreased impulsivity Charles now has the ability to attend and focus for longer periods of time during reading instruction. This enabled me to assist him in examining and processing the whole word and not just the beginning sound. His increased ability to maintain eye-contact to the visual stimulus during the Play Attention games has assisted in visual contact with the individual words and text during reading instruction. Charles is now able to follow the visual stimulus of my pointing to individual words and he is able to point to the words in sequence in simple sentences. Before his ability to attend, focus, and maintain eye contact, Charles was unable to follow the text fluently. The lack of reading fluency affected his ability to comprehend the text. Charles now has the ability to recognize picture and contextual cues, patterns in words or word families, repetition in text, comprehend text, and to make predictions about the events.

Through visual stimulation and relating behaviors to concrete concepts, Charles has demonstrated significant improvement in all areas of his development.

Ned

“Ned” is a student who is diagnosed with Asperger’s Syndrome. He is placed in a seventh grade, full day inclusion program in a heterogeneous environment. He is highly intelligent and scores at 94% and above in all subjects in the regular seventh grade curriculum. Ned is obsessive compulsive, can be both verbally and physically aggressive, and extremely impulsive. The aggression, usually an impulsive response, occurs when he makes a mistake or is misunderstood socially by adults or his peers. When an altercation occurred with his sisters at home, he would usually hit to solve the problem. Socially he has little understanding of cause and effect.

When first beginning Play Attention, Ned would hit the monitor or slam the keyboard down when he made a mistake. I would point out that the screen characters were going the wrong way and that his behavior was making him unsuccessful. Ned could visually recognize that his aggression was interfering with his ability to complete the task at hand. After only five sessions Ned began to accept that making mistakes did not require aggressive responses.

At home Ned had an altercation with his sister and recognized that he only yelled and did not become physically aggressive. He immediately told his mother. He was proud of his accomplishment. The understanding of cause/effect in social situations had begun to develop. Ned stated to his mother that “Play Attention teaches me not to be impulsive.” She praised and reinforced this behavior. Ned now fully understands he must maintain his focus to make the computer complete the tasks at hand which cannot be accomplished if he is reacting in an aggressive manner.

Play Attention games begin with a very controlled, low-stimuli presentation. Gradually, the student is allowed to progress to faster-paced, but more highly stimulating games. I discovered that Ned’s high level of intelligence required him to begin in the faster-paced, highly distracting games. This enabled him to achieve at a higher level of success. The slower paced level of the games resulted in less attention and more frustration. We developed a strategy for Ned that accommodated his needs; he would begin at the faster paced level of the games offering him greater success but still enabling me to address his aggression and impulsivity issues. Now that his aggression is less of an issue, we have returned to the slower-paced level of the games to enable Ned to strengthen his ability to focus and his impulsivity level. Ned is currently able to complete the medium-paced games and his attention and focusing skills have increased to where there is greater success in the completion of the games and less disruptive behaviors. He is currently moving to another state where his mother has already begun to seek assistance to enable Ned to continue Play Attention.

Ryan

“Ryan” is a seven-year-old boy who has been diagnosed with pervasive developmental disorder (PDD), coupled with a recent autism diagnosis, obsessive compulsive disorder (OCD), oppositional defiant disorder (ODD), and AD/HD. He was adopted from an orphanage in Moscow, Russia when he was sixteen months old. He had severe tantrums,

including severely aggressive behaviors, running from the classroom, and extreme defiance. He also lacked cause/effect understanding. Ryan was receiving therapy from a cognitive therapist, psychiatrist, speech/language therapist, occupational therapist, and special educator. He has been on a variety of medications. His parents were told by the psychiatrist there was a distinct possibility of institutionalization.

I approached Ryan's parents offered assistance through Play Attention. Within a three month period Ryan had started to develop cause/effect relationships due to his interaction with Play Attention. His behavioral outbursts still existed, but on a less frequent basis. Ryan's psychiatrist reassessed his behaviors after three months participation in the Play Attention program. He determined that Ryan had matured two and one-half years in his social development. The only change during this period was his participation in Play Attention.

During periods when Ryan was unable to process and understand concepts or encounters an uncomfortable social situation, he became both verbally and physically aggressive as well as defiant. He would attempt to run away, bite, hit, kick, and head but during these periods of aggression. While coaching Ryan during Play Attention I observed that speaking to him in a soft voice or gently rubbing his back with my palm would enable him to calm down and reduce his aggressions. This observation was also pointed out to Ryan. He developed a correlation between his ability to calm down and rubbing his back. At times when he was not able to process or became upset during the session he would request that I rub his back. Ryan needed to be able to calm himself independently, so I instructed him to rub the back of his hand when he became upset. While coaching during Play Attention sessions Ryan was able to observe the effect that the self-stimulation of rubbing his hand had on his ability to calm down. After sharing this strategy with his regular classroom teacher and her reinforcement of the strategy, Ryan was able to generalize and independently perform this calming technique. This enabled Ryan to calm down, become refocused and appropriately interact in the situation. His defiant behaviors and aggressions both verbally and physically have decreased. It is important to remember when coaching that children with AD/HD and Autism may be hypersensitive to touch. Therefore, rubbing or gentle touch may not be a strategy that will assist in reduction of behaviors, but in fact may increase aggression. It is extremely important that with any behavior modification program that you know what triggers negative behaviors.

Ryan's expression of compassion, motivation to learn, and desire to comply with classroom, school, and community expectations has developed to a point where institutionalization is no longer a concern.

Play Attention enabled him to understand cause/effect relationships and develop a higher level of problem solving skills. Having the ability to understand cause/effect relationships opens the door for the coach, teachers, and parents to begin to use positive reinforcement and consequences for behaviors. The combination of coaching, visual reinforcement regarding behaviors and task completion assisted Ryan in understanding cause and effect. It has enabled Ryan to develop socially by exploring the relationship between his behaviors and the reaction to these behaviors by his peers in social situations. Now he has

developed friendships with some of his peers and is able to participate in community and social events.

Ryan has been continuing Play Attention for one year now, but consistently is progressing in his ability to attend, reduce impulsivity, and more importantly control his behaviors. He is an excellent example of neuroplasticity as he developed new neural pathways through the challenges of his feedback based program, the practice of positive behavior modification techniques, and interactive coaching. This training has produced remarkable changes in Ryan's behaviors. His current abilities to participate in social events and his ability to effectively communicate clearly reflect this.

Alex

"Alex" is a nine year old boy who was classified as Behaviorally/Emotionally Disabled and Oppositional Defiant Disorder. Before beginning Play Attention, Alex was verbally and physically aggressive, extremely impulsive, defiant, inattentive, and reading below grade level. His aggressive and compulsive behaviors consisted of actions such as hitting or kicking the computer, and hitting, running throughout the classroom and refusal to comply with the Play Attention and tutoring rules to name just a few.

One of the strategies used with Alex was to point out his behaviors as they happened during the different games. At times the games were exited and restarted after discussing various behaviors occurring at the time.

Play Attention requires a baseline to be taken prior to play. It is a critical evaluation of the student's attentive state at that particular time of day. Initially, Alex had difficulty beginning the baseline and the first game before settling down and attending. Using this as a teachable moment, we discussed strategies on how he should begin a task, remember the instructions required to finish a task, and transfer these skills to use in the regular classroom. This required him to remain calm and focused. Repetition of our strategy brainstorming enabled him to understand particular behaviors that prevented him from being successful in his attempt to complete the tasks. Prior to this training, he was unaware of many of the behaviors that were interfering with his ability to attend.

Play Attention has a behavior shaping program integrated into the system package. As the coach notes particular behaviors, she can enter them into the computer after a game is completed. The computer graphs the number of times the student exhibits a particular behavior. The behavioral graphs in the program were used as immediate positive reinforcers demonstrating to Alex that he could control his behavior *as he became aware of it*. This enabled him to understand and work towards the desired behaviors.

As we progressed with his training, he improved in his general attention. His ability to attend to his reading improved. His reading comprehension and word attack skills began improving as well. As a result he has begun to complete his homework in less time.

Alex was recently reevaluated and the psychologist found that he no longer met the requirements for classification in the behaviorally/emotionally disabled program, but is

AD/HD. He is now placed Other Health Impaired and will begin transitioning into the regular curriculum for part of the day. Recently on his end-of-grade reading test, Alex passed on grade level.

Another commonality between Autism and AD/HD is the students' reactions to sensory stimulation in the environment. The sensory sensations include touch, taste, auditory, visual, olfactory (smell), vestibular (balance and movement), and proprioceptive (positioning of the body). Children with Autism and AD/HD have difficulty with discriminating and integrating sensory input, contending with over stimulation, and processing the sensory input to effectively motor plan. Learning is developed through processing sensorimotor activities. Sensory integration, as described by Ayers, is "the neurological process that organizes sensations from one's own body and from the environment and makes it possible to use the body effectively within the environment. The spatial and temporal aspects of inputs from different sensory modalities are interpreted, associated and unified. Sensory integration is information processing."

How the information is analyzed, processed, and interpreted by the brain determines the extent of learning that transpires. The brain will adjust to the intensity of sensory stimuli, distinguish between different sensory input, and process this information. However, children with these disorders have difficulty with the brain's ability to adjust to the different sensory input; therefore the integration of sensory input requires a great deal of concentration and effort. The erratic input of sensory stimulation affects the brain's ability to respond in a meaningful way. Many times the students will react to over stimulation by concentrating so intensely to one task that they have difficulty shifting their attention to another task. This behavior is sometimes interpreted as lack of attention as opposed to the inability to transition from one task to another. Sensory integration dysfunction prevents the student from being able to shift from one sensory modality to another. For example, the student will only process visual input and not be able to shift to auditory input. Play Attention requires for the students to shift from one sensory input to another. This assists the student in developing the ability to transition between the sensory input due to the repetitive practice during assistance by the coach.

Dennis

"Dennis" is a student diagnosed with Autism and is in a self-contained class for children with Autism. He is on Strattera (a medication for his anxiety and attention difficulties) and has severe Sensory Integration Dysfunction. Dennis was included in the regular curriculum for two hours per day for grade appropriate academics, but was unable to handle the sensory input during his inclusion period. He became aggressive and emotional after returning from the regular classroom situation. Dennis has extreme difficulties filtering and distinguishing the necessary sensory input he needs to process the task at hand. He is unable to transition from visual to auditory and vice versa. This was not discovered until he started two months ago on the updated version of Play Attention. Dennis had previously participated in Play Attention when it only required the visual processing of the tasks. When the auditory input was introduced Dennis was unable to process and complete the tasks he could previously complete. He was attending only to the sensory input that was first required on the task. He was able to attend to

auditory and visual input independently, but was unable to integrate and process both sensory stimulations within the same game.

It was necessary to teach Dennis to correctly respond to both auditory and visual stimuli. Initially, I began to complete the secondary sensory input for Dennis. For example, he would enter the auditory response and I inputted the visual response. Dennis began to associate the expectations of the task with an increase his awareness to the other sensory stimulation in order to be successful with the task. On a limited basis, Dennis is beginning to successfully integrate the visual and auditory stimulations and processing them to successfully complete the games. In the classroom and at home his anxiety to over stimulation of sensory input has begun to diminish. Previously, Dennis needed direct assistance to complete tasks and still needed to be redirected two to three times per minute. He is now able to attend independently for up to fifteen minutes with limited redirection by his teacher.