

PUTTING THE “I” BACK INTO THE “BIP”

The Behavior Intervention Plan (BIP) is included in the 1997 amendments to the Individuals with Disabilities Education Act (IDEA). In general, the amendments include:

- More collaboration with relevant education personnel to resolve behavior problems that may interfere with academic progress.
- Team exploration of strategies and support systems to address any behavior that may impede the learning of the child with the disability or the learning of his peers.
- If a disciplinary action is leveled, the IEP team meets within 10 days to perform a behavioral assessment to collect data necessary to formulate a Behavior Intervention Plan or if one already exists to review and revise as necessary.
- Additional inservice and preservice to learn how to develop implementing positive intervention strategies

The need to properly assess behavior of those with special needs was driven by the fact that behavior often interfered with the ability of one with special needs to be educated in the least restrictive environment. When the special needs student becomes disruptive, noncompliant or avoidant he can become estranged from his peers and isolated from the social interaction necessary for meaningful inclusion. The behavior becomes a discipline issue which in reality is more likely a manifestation of the disability.

Disciplining the behavior out of a challenged student is impossible, especially if it is a manifestation of the disability. IDEA requires that the IEP include a BIP in lieu of a traditional school discipline policy when behavior impedes learning and is a manifestation of the child's disability.

In order to properly design a good BIP, a number of preliminary steps must be taken. Creating an effective BIP for individuals with FXS is similar to designing a sound instructional program. Recognizing that the environment plays a major role in the way a student with FXS learns and behaves is critical. Identifying overt behaviors (physical aggression, yelling out, destruction, etc.) although important, does not identify the cause of the aggression. It is my contention that if the behavior reaches an aggressive level it is most likely due to a weakness in the behavioral support system. There are usually antecedents (triggers) that when unaddressed contribute to the behavioral escalation. For example; if a child becomes silly when presented with a transition and is simply admonished without any modification, the behavior will continue, because the function of the behavior has not been addressed. The student's behavioral repertoire will change to meet his need to avoid. Without modifications, the behavior will escalate to an aggressive form (hitting, kicking, yelling). When the level of aberration is increased, it can no longer be ignored and the behavior serves the ultimate purpose; to make the transition stop.

This example highlights the need for a Functional Behavior Assessment (FBA). This assessment is designed to identify the contextual factors that contribute to the behavior. When properly conducted, the FBA identifies the conditions under which the student is successful or unsuccessful. In the example given it may initially appear that the student is oppositional whenever asked to comply, but the student may anticipate a fearful experience created by the unknown. Because the student lacks the ability to express the affective nature of his behavior, he must act it out. Often with students with FXS anxiety becomes the driver for aberrant behaviors. The underlying fear must be addressed in order to effectively intervene.

Because students with FXS demonstrate a behavioral delay – the behavior does not always immediately follow the antecedent – the FBA should be conducted over several days and should utilize a team of professionals from a number of disciplines. When a team approach is used, the assessment gains perspective. The educator may be able to determine that a skill deficit is the antecedent, while an occupational therapist might identify an environmental antecedent that has sensory implications (loud sounds, proximity or crowded conditions) and a speech therapist might identify an expressive language deficit that causes embarrassment that results in aggressive outburst.

After assessing the function of the behavior the intervention begins. Often, a student with FXS has habituated a behavioral response so a prosocial response needs to be taught. This is the true essence of the BIP; teaching an intervention that replaces the maladaptive behavior.

The reason for writing this article is to highlight the importance of the intervention portion of the BIP. Without the focus on “I”, the BIP is simply a piece of paper to document behavioral episodes. Designing an intervention requires careful consideration. It is necessary to identify the antecedent, but equally important is finding ways to teach the student new coping strategies. With proper support the student gains benefit from the intervention and becomes more prosocial in his reactions.

Plan to be proactive and understand that IDEA provides ways to keep the student with FXS viable and included with typical peers.

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BRADEN ON BEHAVIOR

OPPOSITIONAL.....OR MERELY ANXIOUS?

I'm often asked, "Is he just defiant, or is there something else going on? He refuses to comply and he seems to want to manipulate me."

Actually, children with or without FXS learn to maneuver in their environments in order to survive and thrive. In order to discern whether a behavior is oppositional or merely a reaction to anxiety, pay attention to your reaction. If you provide social attention (everyone's looking at us, what do you want?), emotional attention (what's wrong, why are you crying?) or negative attention (stop that, you won't get ice cream if you continue to yell, etc.) you are most likely reinforcing a behavior that will persist.

I've talked a lot about the need to break behavioral chains by changing the habituated responses of the caregivers. This strategy can be an effective way to change a behavioral outcome. In other words, if reinforcing the behavior maintains it, it is most likely oppositional because your reaction can have an effect on the behavior. If on the other hand, the behavior continues to escalate even after dutifully changing your reaction, the child is most likely reacting to his physiological system. A number of researchers have noted that children with FXS have higher levels of physiological arousal in stressful situations (Cohen, 1995, Miller et al. 1999).

Generally, the oppositional behavior in children with FXS escalates when the stressful event persists. If the child is reacting to stress, the defiance will increase as the stress increases. If the stressful condition is modified, the reaction changes because it is no longer necessary for the child to react to the stress, proving that the behavior is a reaction to the anxiety. If the behavior occurs randomly and in isolation, it most likely is not a reaction to stress and therefore not anxiety driven.

Sometimes, it is a challenge to eliminate the condition that causes the child to become anxious and oppositional. Perhaps a novel experience – going to a new school, joining a club, attending a youth group elicits an initial reaction to avoid the experience. In these situations it is important to encourage the child to increase his tolerance and experience the new situation. This can be accomplished by providing desensitization through a gradual process. First, expose the child to the novel experience with a set end time. As the child becomes comfortable, the length of time expected to tolerate the experience should be increased. It is important to be concrete and exact with the desensitization process. Consistency helps the child trust this process. Knowing that there is a time certain ending and it is predictable, allows the child to relax and successfully participate.

Timers, pagers and token boards can be used to provide a tangible reminder of how much longer the experience will last. A token board is a version of a token economy but can also be used to signal completion of a task. The board becomes a motivational tool to provide tangible evidence of progress toward a goal. This tangible evidence is in and of itself reassuring. Providing verbal reminders of an abstract end time (10 more minutes) is not helpful. When the child is stressed, 10 minutes may as well be an eternity.

The token board can also provide distraction when a child's anxiety becomes overwhelming. As the child pays attention to the tokens being moved, he is distracted from the anxiety provoking event. The tokens can be moved across the board to provide a visual count of how much time has passed and what remains. Customizing the board by using pictures and tokens that reflect special interests provides familiarity which is comforting.

In summary, remember that children with FXS often fear their own anxiety and become even more upset during an emotional meltdown. This anxiety impacts their ability to function in the mainstream and access their environments. If we provide them with a way to communicate distress without acting out, we can help release them from feelings of guilt and embarrassment associated with a behavioral reaction. This kind of behavioral support helps the child gain control and ultimately manage his own behavior.

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BRADEN ON BEHAVIOR

BACK TO SCHOOL WITH A BANG

My usual topic has been modified to fit the back to school theme because going back to school after a relaxing summer can be quite a challenge. The fact that transitions back to school can be anxiety provoking sets the stage for this column.

Summer break usually includes a variety of outdoor experiences, which incorporate physical activity. The school-learning environment is different from the less structured activities of the summer. Even though the imposed structure of the classroom can be somewhat positive, it is the transition of getting ready to go back into the classroom that can makes it difficult.

There are several strategies that can be of help in guiding a successful transition. If the student is going back to the same school with the same teaching staff, the transition process is easier and requires less support. When the student changes schools, neighborhoods, or programs the support requires additional strategies.

Prior to the start of school, take digital pictures of the school, classroom, playground or school ground and school staff. These pictures can then be incorporated into a story about going back to school. The student can either read or be read the story. Repetition of the story can provide familiarity and predictability, making the unknown or novel experience less intimidating. Another option is to make a video of the school facility along with a welcome message from the teaching staff that will support the student. Other staff members working around the school (janitors, school secretaries and cafeteria staff) should also be included. Watching the school video will become a pastime that is both enjoyable and a positive strategy.

Whenever possible, it is helpful to find classmates to accompany the student with FXS when going back to school. This buddy can describe differences to the student with FXS over the phone or internet. Establishing a routine to walk to school with a friend or sibling, ride together in a carpool or school bus is helpful. Routine brings predictability, which is self-calming and reassuring. When the early morning routine becomes habituated, entering the classroom and starting the day, simply becomes an extension of that process.

If your child is going back to the same school in the fall, often, social stories can assist in a less direct way while reducing the anxiety created from concern and worry about the upcoming school year. The stories can include a story line about how exciting it is to go back to school. The story can conclude with a description of the strategies mentioned above, list names of classmates and a biography of the new teacher.

Beginning the year with a bang can be positive and less intimidating when proactive strategies are employed. It is very important to take time to plan the transition before school starts so that the beginning can prompt a positive outcome. We know that individuals with FXS habituate routines rather quickly, and find comfort in the sameness of the repetition. Making that routine available before the first day of school, will certainly increase the likelihood that the rest of the school year will be positive and productive. Good luck with your transition and may this school year be the best ever.

Braden on Behavior

Have Purpose Will Transition

Transitions can create havoc in the lives of many with FXS. Anything from changing a driving route to moving into a new house can shift the foundation and cause a behavioral outburst.

During our parent consultation clinics, Tracy, Mouse and I create significant transitions when we ask parents to bring their children us. Often, this occurs in a hotel conference room several miles away from a familiar environment. As we have struggled to deal with the fallout from these necessary transitions, we have discovered ways to reduce the impact of the transition on behavior. Obviously, this is essential to our ability to evaluate learning, speech and sensory functioning.

We have found that creating a mission or purpose for the child helps to reduce the negative effects of the transition. Being committed to a purpose gives meaning to the transition and reduces the anxiety often created from not understanding why it is happening. For example, if the child has a specific purpose when entering the conference room, the fear of the unknown is replaced with a purpose and a mission is set. We have suggested that the child bring something into the conference room from the front desk as a delivery, or from the restaurant (sugars and creamers) to set up a conference room coffee bar. Although somewhat contrived, these strategies can often be more effective in reducing the behavioral fallout from transitions than others described in the literature.

Sometimes preparing for the transition creates so much anxiety that the child can do nothing but persevere about it. The upcoming doctor's appointment, field trip or new day care setting becomes the focus of conversation. The obsession with the transition becomes yet another behavioral issue to contend with. Again, the child may be better prepared by having a job to perform as part of the field trip or a gift to deliver to the new day care provider. It is critical that the child feel that the job or mission is important and that he has the necessary skills to carry out the mission (set up a display, fill a box with a material, finish up a task.)

A case study using this kind of intervention involved a child who had difficulty transitioning from his mother's car in the morning drop off at school. He would often hit and kick the Para professional assigned to bringing him into the school in the morning. A variety of strategies were implemented, and although somewhat helpful, the behavioral episodes continued on an infrequent basis. It was only when the staff created a ritual that was reinforcing to the child that the behavior changed and the transition was tolerated. The transitional ritual required the child to bring pennies from his mother as he left the car, carry the pennies

into his classroom and place them in a bank. The pennies were then exchanged for tickets and other items of interest later in the day. Again, the strategy provided the child with an end to a means and over rode any fear or anxiety created by the transition.

Many books and articles have been written about how to support a child with special needs when making transitions. Typically, the strategies include; giving reminders of an upcoming transition, using a timer or hour glass to mark time prior to the transition, singing or playing a song that signals the transition, providing a picture schedule of the daily events with particular emphasis on the changes and providing a transitional object, picture or toy that might facilitate a smoother transition just to name a few.

In the case of those with FXS, habituation of a ritual provides the child with comfort created by a recurring routine. It is my experience that people with FXS habituate rituals to mitigate the extraordinary events of life that have no predictability or consistency. It is the unpredictability of an event that feeds anxiety. Replacing an imminent change with an habituated ritual will shift the focus from the unknown to the known, making the transition more tolerable. Designating a specific role (delivery person, coffee bar helper, ticket collector, hall monitor, office helper, PE assistant) creates a mission that becomes the focus and overshadows the transition that follows. The success of these strategies depends on the creation of the contrived missions and the consistency of the implementation.

Normally, my column focuses on issues that typically get my attention through parents' request for help. The issues tackled are usually common to those with fragile X syndrome. This column content resulted from a conversation I recently had with my friend and colleague, Dr. Karen Riley. After pondering the idea, I asked if Karen would join me in writing this quarter's column. She agreed to writing most of the article and I took full advantage of her (offer). I feel it is a good diversion from my normal content and hope you agree.

BRADEN ON BEHAVIOR
A Real-Life Reality Check

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Reality shows have taken over our television programming. Rather than watching fictional characters perform comedic, suspenseful or dramatic scripts we now observe "real" people compete, struggle, argue and live their lives. These programs entertain us and sometimes attempt to educate us. Various "pop psychology" programs including *Dr. Phil* and *The Super Nanny* have crossed over to providing parenting advice. The success of these programs validates the notion that parents in our society are continually reevaluating their parenting strategies and looking for a particular approach that will work for their child; thus putting their concerns and worry to rest. Families with children with fragile X syndrome share similar concerns but are faced with additional challenges.

Popular parenting advice whether it comes in the form of a television show, a self-help book or a prepackaged program can provide insight and applicable strategies. While this information can be helpful it may be misleading enough to cause additional stress, especially for families with children with special needs. The trick is trying to determine which programs can be helpful and which strategies should be adapted.

There are several factors to consider when evaluating the applicability of a parenting program for children with special needs and specifically those with fragile X syndrome. Although some of the strategies can prove helpful, it is important to remember that these programs were designed to address the behavioral needs of typically developing children with intact sensory systems that provide accurate feedback from the environment and language systems that are capable of both comprehending and remembering the verbal directions that are provided. When attempting to employ any of these strategies, one must first critically view the program through lenses tinted by our knowledge of the strengths and weaknesses of children with fragile X syndrome.

This process can be difficult to navigate. Possibly the best way to explain this process is to provide an example. In a recent episode of the Super Nanny the family was faced with children who were having difficulty sleeping alone and with following their mother's directions. The Super Nanny recommended creating a routine around daily activities that involved spending time with each of the children separately. She also recommended developing a bedtime routine that involved specific expectations and guidelines for putting the children back in their beds each time they got out. The parents employed this tactic and through 45 minutes of screaming and crying, the children stayed in their beds and finally fell asleep. The Super Nanny also recommended placing the children in the "naughty chair" when they did not follow their parent's directions. The parents were instructed to discuss the situation with their children and place them in the naughty chair for one minute for each year of their age. The children were then told that when they said "I'm sorry" they were allowed to rejoin the family. Once the children left the naughty chair, their parents talked with them about the situation that had occurred and why they had been placed in the naughty chair. The parents expressed sadness while they watched their children struggle with the new expectations and consequences for their behavior and continually questioned the new approaches. They received support, encouragement and direction from the Super Nanny and by the end of the program the children's behavior had improved.

At first glance many of the Nanny's suggestions would seem applicable to a family with a child with fragile X syndrome; including the implementation of daily routines and adhering to a consistent set of previously agreed upon consequences. The naughty chair is a new and clever way to refer to time out, which can be an appropriate consequence for inappropriate behavior for children with fragile X syndrome.

The manner in which these approaches are applied is where the scrutiny should begin. The Super Nanny provides the children with a great deal of verbal explanation. This much verbal instruction is counter-therapeutic to individuals with fragile X syndrome. Short and concise directions are more effective for children with language delays and attentional issues. One minute per year for time spent in the naughty chair or in time out is too long for individuals with developmental delays and poor impulse control. Time out should be linked to a specific behavior and when the time has elapsed the child should be allowed to re-enter the situation i.e. the classroom, group or family activity. The Super Nanny requires the child to apologize after their time in the naughty chair has elapsed. If the child does not apologize the Super Nanny recommends placing the child back on the naughty chair. Requiring a child with fragile X syndrome to apologize confounds the presenting infraction with a behavioral dilemma. The child is not only being punished for the original infraction, but then runs the risk of additional punishment for being unable to apologize. This complex behavioral expectation can be provocative. For example, we know that individuals with fragile X syndrome are often unable to speak on command due to their language

delays and performance anxiety. Holding out for an apology may distract from a positive and compliant outcome.

This short scenario illustrates how one popular parenting program could provide helpful strategies and at the same time be a prescription for frustration and failure. So what is the bottom line? Watching these types of programs and/or reading books on parenting strategies can be very helpful and somewhat inspiring and normalizing. These programs show how many families struggle with some of the same issues that a parent of a child with fragile X syndrome might be dealing with. A new approach can sometimes breathe life into a creative remedy for an ongoing behavior problem. The key is to understand that these programs were developed for typically developing children.

In summary, use these guidelines when considering the application of popular media approaches.

1. Remember that most programs are developed for typically developing children who do not have a neurobiological disorder.
2. Before implementing any plan review it with someone who is familiar with fragile X syndrome and your child.
3. Programs that involve discussion and explanation need to be reviewed carefully, as children with fragile X syndrome have language delays and sensory deficits.
4. Prioritize the behaviors you want to target. Choose to change behaviors that are most debilitating to the family's wellbeing and harmony. These may differ dramatically from those that present in typically developing peers.
5. Understand that parenting is both one of the most challenging and rewarding experiences in a lifetime. Stay the course and celebrate the successes!

BRADEN ON BEHAVIOR

The Role of the Family System on Behavior

Recently, I have had the opportunity to assist several families about behavior problems that have affected the entire family. During the problem-solving phase of our interaction, it is often clear that certain aspects of the family system contribute significantly to the targeted behavior of the child affected by FXS. Even though the family may be aware of the tenants of positive behavior support, that awareness can be lost in the “moment” or maybe not even acknowledged due particular patterns that have been embedded into the family system.

The families indicated that the most difficult times to manage their child (ren) with FXS are during the “hurried” time frames of the day. For example, the before school routine is especially difficult and often the most likely to trigger behavioral aggression or outbursts. The quick analysis is...“everyone is rushed, so the person with FXS shuts down under the pressure”. The more difficult task, is deciding how to structure the morning with less chaos and more structure. Not only is the person with FXS feeling the pressure, but so is the family system. Most families have a number of people impacted by the tight schedule in the morning. For example, parents are getting ready for work and the other family members are scurrying to find their homework, book bags and gym clothes under a time constraint.

Because the child (ren) with FXS has the most difficulty dealing with the anxiety of being rushed, the entire family runs the risk of a behavioral episode affecting everyone’s morning. Without actually planning it, the family employs methods of adjustment in order to keep the system running smoothly. These adjustments may include ways to pacify the child affected with FXS that is not necessarily behaviorally sound. The problem is that even though the short-term fix gets the morning up and running, the child with FXS becomes accustomed to the adjustment and the next morning demands it as a way to gain prediction and preserve sameness. This may not be significant in isolation, but consider the fact that if every day the system readjusts to “keep the lid on”, the entire morning routine is no longer a routine, but an opportunity for the child with FXS to become more confused and frustrated.

Perhaps even more salient is the emotional byproduct this readjustment brings to the family. Each family member not affected by FXS experiences an imposed reaction that can breed resentment and anger. In a recent consultation, two children not affected by the gene, shared their resentment about keeping their brother with FXS happy in the morning. They felt as though their parents “gave in” far too often, but also felt trapped because if the behavior escalated, the entire family risked being late and upset. In addition, they disliked the emotional loading they experienced when the behavioral episode occurred right before leaving for school in the morning.

The solution we brainstormed was to practice a morning routine during a weekend with the family continuing to incorporate that routine on a consistent basis on school days. A

back up plan was put into place if the child with FXS had a behavioral episode that would impact the other family members' morning schedule. Interestingly, the routine became habituated in just a few days, and a consistent morning routine was reestablished. There may be many reasons this plan worked so quickly, but the most obvious was the fact that the entire family could relax in the morning due to the fact that they were able to affect a positive change. They also knew they had a back up plan that would preclude a negative outcome. This plan also provided the child with FXS with a predictable routine, which reduced his level of anxiety as the family system operated in a consistent and predictable manner.

This issue is not unique to this family. Sometimes, we focus so much on the behavior of the child with FXS that we fail to see the interaction between the child and the family system. Before embarking on any behavior plan, look at the system maintaining the behavior and consider the environmental factors that may be contributing to the aberrant behavior.

The Fruits of a Community's Long Labor

This column usually focuses on behavioral issues and then offers suggestions or remedies based on research and experience. This issue, however, will divert slightly from that format. Instead, we will celebrate the fruits of many people's labors by highlighting successes from some very special people who have fragile X syndrome (FXS). As I reflect on these successes and the history of my involvement with these individuals and those who have supported them, I am filled with excitement and enthusiasm. I am in awe of the energy, dedication and devotion they have shown through the years.

When I think back on my own professional experiences, there was a time when we were working hard simply to identify those affected by FXS and in some way quantify what we were seeing in them as a group. We were occupied with defining phenotypes and developing intervention strategies that were effective. This was important work, and it established the foundation for further study of the condition and its clinical underpinnings. But it was not nearly as exciting as the present. The hard work done by many back then has resulted in a number of wonderful stories that I want to share in this column.

Two years ago a couple brought their 8-year-old son with FXS to me to evaluate. They had read about effective educational strategies in the literature and wanted to access those strategies for their son. They knew he was capable, but he had not been able to learn how to read. They sought out intervention strategies to increase his probability of success. The evaluation enabled them to advocate for certain supports and teaching methods in his school. As their efforts grew, the district found a gifted teacher for their son and afforded her telephone consultation with me to develop additional interventions as needed. The young man is now reading and spelling better than anyone had anticipated. He is included in a general education classroom and is learning to make friends-all because two parents and a teacher joined together to accomplish great things!

Another couple worked diligently with their parents to establish a trust to support independent living for their adult son with FXS. His mother found a home in a middle class neighborhood in the Midwest. She worked tirelessly to convince the neighbors that the four boys moving into this house would be good citizens and even better neighbors. She contacted a number of businesses that donated materials for the remodel as well as gym equipment and furnishings. When their son turned 30 they moved him into the house with three other young men with similar challenges, and the rest is history-a beautiful history of sheer determination!

Across the country on the west coast, another family handed their young son with FXS drumsticks and a drum set. His father (a professional drummer) provided him with opportunities to drum with him and learn music. As this shy young man matured, he

became more and more accomplished, eventually joining the marching band in his high school-capped by performing a solo concert. All of this was accomplished because his parents refused to believe he was incapable of achieving his goal to be a drummer and play in the band.

Another mother in the south contacted a district's director of special education and requested that her son's teaching staff receive training on best practices with those affected by FXS. She had faith that her son could learn more adaptive behavior even though he was struggling with significant self-injurious outbursts. She was convinced that with proper intervention, his behavior would improve and he could be included with typical peers. The director heeded this mother's efforts and contracted for services to develop strategies and train the teaching staff. In addition, the staff was given the opportunity to conference with experts monthly by phone to continue developing interventions that worked to maintain the boy's adaptive behaviors. Currently, his success is continuing as he participates in activities with his typical peers and is thereby further motivated to reduce self-injury.

Four sisters in the Midwest with FXS became motivated to make educational materials for others affected by the condition. They learned to cut and laminate, package and mail out the products. Their efforts have provided materials to hundreds with FXS. Their success was rooted in motivation to help others with their own condition, a foundation of support from their parents, and an overall sense of compassion.

A 40-year-old man in the west affected with FXS always wanted to learn to read. He was very aggressive and violent as a child and adolescent and was never emotionally stable enough to be educated with much success. His mother weathered a long storm of psychiatric placements and hospitalization but she never lost sight of his dream. As he grew older, she sought out private tutoring and for Mother's Day last year received a DVD of her son reading to her. Imagine the impact this beautiful gift had on her-and her son. It was only possible because she refused to believe he was too old to learn and to accept that his potential faded with age.

A father from Germany attended the 2008 International FX Conference in St. Louis and heard about clinical and educational techniques that could change the outcome of those affected by FXS. He decided to take that information back to his country, where he worked for a year organizing an educational conference that reached an astounding 300+ teachers and parents in Germany. His dedication to his son prompted him to bring possibilities to others in his home country so that they too might experience success.

There are many more such stories of families and support workers who have been motivated by these very special people with FXS to push through brick walls and climb mountains supporting the development of their potential. I am humbled to have been among them and to call them colleagues and friends in this remarkable Fragile X community.

Navigating the Road to Inclusion

Including special needs children in general education classes is grounded in special education law. But however sound the theory and purposeful the law, having special needs students successfully included with typical peers often eludes reality.

The momentum to include students with FXS in the general education mainstream grew out of the Individuals with Disabilities Education Act (IDEA). The assertion that children with disabilities had a civil right to attend school in their home school setting grew out of Civil Rights litigation. The emphasis to include students with FXS in general education classrooms has been noted throughout the literature. Perhaps the impetus for this movement comes from the fact that children with FXS have a considerable interest in people—one of the hallmarks of this population is a strong desire to interact socially. This often makes inclusion more viable and increases the success rate.

It is important to remember, however, that levels of affectedness vary from one individual to another, and placement options must include enough flexibility to meet individual needs. There are occasions when inclusion can wind up being restrictive to children with severe needs.

Symons, Clark and Roberts, 2001 studied the classroom engagement of elementary school children with FXS and determined that the engagement was strongly related to the environmental and instructional quality propagated by the teachers and classroom. How the teachers structured and arranged the classroom environment was much more important to student engagement than were specific aspects of the child's Fragile X status, medication use or dual diagnosis. This research clearly defines a number of environmental and instructional factors that are important when choosing a general education classroom.

Successful inclusion cannot be accomplished without a systematic, sequential process. Just placing the student with FXS in a general education classroom with a para-professional close by does not necessarily constitute success. As a matter of fact, students with FXS are often excluded because they are unsuccessful in their included environment. The criteria to assess success in the classroom often rests on the student rather than the education team. Without appropriate supports, students with FXS will fail to access certain aspects of the school curriculum.

Likewise, the mere placement or proximity to typical peers is insufficient in achieving an appropriate education for students with FXS. In order to design effective outcomes, the parents and school team need to define the purpose of the inclusion. In other words, there needs to be a reason for the student to be included. Otherwise, the time spent in the general education classroom may reduce the time needed for other services that are often equally or more important to the child's individual educational

needs. The chart that follows defines a number of the necessary supports given specific targeted outcomes associated with the inclusion of an individual with FXS.

Outcome	Necessary Supports
Social	<ul style="list-style-type: none"> • Viable peer group • Social facilitator • Flexible setting • Opportunities for natural contexts
Behavioral	<ul style="list-style-type: none"> • Appropriate role models • Structured and predictable schedule • Cooperative learning opportunities • Organized classroom • Professionals familiar with FX behavioral interventions
Academic	<ul style="list-style-type: none"> • Specialized instruction specific to FX learning style • High interest content • Enrichment opportunities • Emphasis on visual presentation • Opportunities for priming or pre-teaching • Collaboration between Sped and general education staff
Vocational/Prevocational	<ul style="list-style-type: none"> • Viable work models • Positive work environments • Flexible breaks • Consistent staff

After the desired outcome is established, the team needs to design certain strategies to assist the student to be successful in the general education classroom. If the student outcome aims for participation in the general education curriculum, it is often important to prime or pre-teach certain concepts or lessons beforehand. Collaboration between the special education and general education staff is critical to accomplish this level of coordination. When effectively done, this priming will help link individual instruction into larger group activities. This can also be effective when the desired outcome is to increase social interactions with typical peers.

The level of prompting and facilitation should be determined based on the need of the individual. It is always best to use the least intrusive level of facilitation as possible. The student's behavior and level of participation will dictate the need for more or less teacher or para-professional support. Because children with FXS respond better to visual input, effective prompting can often include visual schedules or icons. This enables the student to participate with less dependency on the attending adult. In addition, it is best to have the classroom teacher responsible for redirection and facilitation because that is most like what is done for typical peers. Classroom rules and behavioral expectations should be the same for students with FXS unless there is a

Behavior Intervention Plan (BIP) in place, which usually defines certain behavioral characteristics to be a manifestation of the disability. In those cases, special considerations are required.

Transitions can be difficult for students with FXS, and they are very common in the general education setting. Providing a predictable schedule with visual supports is important. If the student is aware of the change ahead of time, the element of surprise is eliminated. In addition to providing a visual schedule and other structured strategies, teachers can use using a less direct approach such as side dialoguing among the adults in the classroom to alert the student to pending changes. (“So Ms. Johnson, it looks like we’ll be ready to dismiss the students for lunch in five minutes.”)

It is often prudent to afford the student with FXS an opportunity to carry equipment from the gym back to the classroom or assign him or her some particular job to complete as part of the transition time. This may help reduce the anxiety associated with the change.

Because students with FXS learn incidentally, including them to absorb information in this manner is significant. It is also important, however, to be sure the student is in fact learning the information. The para-professional assigned to the student should take notes on the subject matter discussed in the general education classroom and then ask the student questions about the content later in the day.

Recently, after observing several special needs students in their included environments, I was struck by the poorly planned execution of their inclusion. Each had a para-professional in close proximity, tending to the student as if the para-professionals were teaching a class within a class. The tutorial relationship between the student and para-professional precluded those with FXS from being able to participate in the natural interaction within the general education class. In one setting, the students were grouped in sets of four and the students with FXS sat at their own table with two para-professionals and no general education peers. The obvious question was: How does this qualify as inclusion? Inclusion is *not* “making students with FXS look typical;” it is instead helping them bring their own unique qualities into the general education classroom, with full access and acceptance, to the benefit of all.

Hopefully, with good planning and emphasis on desired outcomes, the intent of IDEA will continue to bloom into positive and fulfilling experiences for students with FXS—and for those with whom they share a learning environment.

Braden on Behavior
Is Your Child's Behavior a Manifestation of His Disability?

Recently, I have been consulted on several cases related to students with FXS being suspended from school because their behavior was believed to be threatening or dangerous in a school setting. The student was then suspended through a manifestation hearing until further investigation could be carried out. Clearly whenever this happens it begs the question, "was the behavior a manifestation of FXS?" In other words was the reason for the behavior related to the FXS behavioral or cognitive phenotype? By that, I mean was the threat actually intended to be a threat which had potential to be carried out, or was it a reaction to an event or circumstance? Before considering suspension and possible expulsion it would be important to determine if threatening someone may have been the only way that the person with FXS could express the gravity of the personal discomfort associated with the event.

These types of behavioral infractions only serve to provide more evidence that a functional behavior assessment FBA is imperative whenever a behavior is suspect. It is absolutely critical to assess the nature or the function of a behavior so that the school personnel understand why the behavior is occurring. It is simply not enough to deem the behavior as one of escape without considering the behavioral correlates. Several investigators have explored the possibility of higher cortisol levels after exposure to novel social situations being linked to avoidant behaviors.

There is a significant body of research suggesting that many individuals with FXS exhibit some level of anxiety (Hessl et al., 2002, Baumgardner et al., 1995, Hatton et al., 2003). Those individuals who are unable to regulate their anxiety must rely on those around them along with the environment to assist. A student, who is more challenged, will learn to act out in order to communicate discomfort. As the student's behavioral pattern becomes habituated, he learns that if at one level his need to escape does not get noticed, he will simply act out more so that someone will address it. Often with the remedy comes a sanction which involves removal and provides the student with relief.

Because the public school system now employs zero tolerance for violent behavior or threats, this issue has become increasingly more timely. Simply explaining away the student's threatening behavior as part of being FX is no longer acceptable. Even though special education law clearly mandates allowing for special considerations whenever discipline is needed, that determination must be decided on prior to the suspension, otherwise the threat is treated just like any other typical student without special needs. The student with an IEP who has been identified as a student with special needs can be afforded an alternative to school discipline policies but only when it is specified in a behavior intervention plan. No longer can the student's behavior be addressed on a "wait and see"

basis. If the student has a history of anxiety which has resulted in threatening behavior, it must be analyzed and the function documented to avoid future misunderstanding.

The school staff is trained to be hyper vigilant in their recognition of threatening behavior and to preempt any threat or act of violence. They are taught that it is not their responsibility to assess the lethality of the threat, but rather to report it and then allow those individuals who are experts, to determine the severity and motivation. If the suspended student is one identified with special needs, it is mandated that the staff first determine if the incident is a “manifestation of the disability”. The problem is that often, the individual with special needs is not given special consideration because the behavior was never documented as a manifestation of a diagnosis or condition such as FXS. This is often where the process falls short and the behavior of the student with FXS is not properly remedied. If the staff, parent or caregiver advocates for the student during the manifestation hearing and the consensus verifies the fact that the behavior is a manifestation of the disability, the process ends and the student returns to school with a behavior intervention plan in place whenever the behavior occurs. If there is inconsistent evidence or no consensus then an independent evaluation can be requested but the student is precluded from attendance during the fact finding stage so that no harm can come to anyone while things are being sorted out. It is much more prudent to have this all determined during an IEP meeting in order to avoid the manifestation hearing and all subsequent remedies required.

Often, even though the independent evaluation can be provided by the school district, the person conducting the evaluation may not be an expert in FXS and may misinterpret the intent of the threat by determining that the behavior is not a manifestation of the disability. This can then cause the student with FXS to be separated from his school community. As has been well documented, individuals with FXS often become rueful and sad whenever they feel estranged from their peers. They might persevere on the incident that occurred and find it uncomfortable to return to school the longer the suspension continues. This reaction may become even more debilitating than the initial infraction. In a recent case when I was contracted as an expert to provide an independent evaluation, the infraction occurred just prior to May and the student did not return to school until early November.

A particularly important adjunct to the prescribed remedy is to target verbal and physical threats, so that the student’s behavior can be modified and shaped into a more adaptive way to express discomfort or anxiety when reacting. Doing this at an early age will help the child understand the gravity of the reaction so that the behavior can be reduced and eventually eliminated. The function of a threatening and violent behavior is most likely a primary reaction to an event or circumstance that has evoked a significant amount of anxiety. Sometimes these reactions can be provoked by sensory input that may be difficult to control. It is in this context that a threat can be misunderstood and explained away by

misconduct or a serious behavioral episode. Something as simple as an alarm or school fire drill can cause one with FXS to threaten to kill someone or set the school on fire because the reaction to the sensory input is so extreme. Those observing such a reaction without training or understanding will respond in a way that can be punitive or frightening.

When a student with FXS is admitted to a school program or when an IEP is reviewed, be sure to examine very carefully any role anxiety has played in his behavior and discuss thoroughly the behavioral phenotype related to anxiety. It is always prudent to request a functional assessment of the behavior as a proactive strategy so that any subsequent discussions can form the foundation for sound behavioral programming and the elimination of any misunderstanding that could ultimately result in suspension or expulsion.

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Braden on Behavior side bar
The Ten Deadly Sins of Poor Behavior Management

- Never force eye contact except when teaching social engagement
- Be consistent
- All behavior serves a purpose, analyze the function before implementing a plan
- Remember that sensory input can have a direct relationship with aberrant behavior
- Remember that behavior is often a means of communicating
- Target one behavior at a time
- Count frequency and duration before you decide to target a specific behavior because it may not be as bad as you think
- Behavior does not occur in a vacuum; think outside the box
- Utilize a multidisciplinary team when creating behavioral remedy
- Don't battle biology (Dr Karen Riley)

Braden on Behavior

“Happy Birthday” Meltdowns and Other Behavioral Conundrums

A client asks: “Why does my child cry when people sing ‘Happy Birthday’ to her? Many years ago when I first heard this from a parent of a girl with a full mutation, I thought it was rather strange and perhaps something unique to this child’s behavioral repertoire. Later, after meeting other families of children affected by FXS, I learned that this was not an anomaly, but rather quite common.

Why would hearing “Happy Birthday” provoke such a strong reaction?

The answer is really quite simple. Children with FXS tend to find it very uncomfortable being the center of attention. The focus that comes with the singing, and then being urged to blow out candles and make a wish can result in a complete meltdown and behavioral nightmare. The problem is then compounded on every subsequent occasion, when the memory of being overwhelmed by all the attention becomes reenacted. Often, the “gestalt” (wholeness or totality) of the experience becomes so solidified that it is very hard to convince the child that it will not make her anxious the next time it happens. To make matters worse, the child may find it difficult even when the song is sung to someone else. Parents point out that the anticipation of a birthday party for another family member can be so intense for the child with FXS that the family decides to exclude the song in its celebrations.

This is an excellent example of a child with FXS packages an experience and continues to respond to it in the same way each time it occurs. Even something as innocuous as a casual compliment can result in a behavioral episode for a child who cannot tolerate being in the limelight. Giving a compliment is considered a standard social nicety, but in the case of one with FXS, it gives way to a negative result.

Another example is of such a conundrum is when a child anticipates a special occasion with great excitement, only to melt down behaviorally when the time comes. The paradox of the child who has been speaking nonstop about an upcoming vacation, only to react with a behavioral meltdown, is perplexing and difficult to resolve for parents. Unfortunately, the excitement and anticipation of the vacation gets translated into anxiety and even terror for the child, who becomes stymied and is forced to retreat into a familiar comfort zone.

What about the other classic scenario of a child who sees her teacher at the supermarket? For the child with FXS, this situation can cause her to become so overwhelmed that she responds with aggressive behavior, to the extent that it is necessary to exit the supermarket. This can dumbfound a parent, who knows that the teacher is a favorite and the child talks about him all of the time. Why then, does the child respond to him in such a negative way outside the school setting?

The context of the relationship and the element of surprise that accompanies seeing the teacher at the supermarket, out of his usual context, create a significant shock, and the

child is flooded with anxiety. The child's confusion surfaces, along with an inability to adapt and respond. Again, this example illustrates how an unexpected event, out of context, can cause a significant behavioral incident.

Another conundrum: Mothers, who are usually the primary caregivers, report more aggressive behavior directed toward them than other family members. How can this be? The very person who offers support and comfort seems to be more susceptible to attacks. The answer follows a peculiar logic: The child sees the mother as an agent of great power in reducing anxiety and providing comfort. When something unexpected happens, the child anticipates his mother's intervention to reduce his discomfort. If immediate relief is not experienced, he becomes disappointed and angry. The closest target to release the anger is usually the mother. The anxious reaction escalates into a fight-or-flight reaction and the mother bears the brunt.

Other families have reported frustration over the fact that their child rarely engages in spontaneous communication, but when he does, uses profanity and four letter words. What's more, the context is perfect and the articulation very clear. This is frustrating because the family's aspiration for the child to communicate gets juxtaposed against this inappropriate verbal response. Often, when a child has not experienced the power of communication in traditional conversational exchange, a strong reaction from others around him such as a grin, giggle or even reprimand, becomes highly reinforcing. The more negative the reaction, the stronger the motivation to continue "communicating" with cursing and four letter words.

Even though these examples present as conundrums, the common thread is the extreme reaction individuals with FXS have to an unexpected or anxiety provoking experience. Anxiety in these individuals results from being hyperaroused. The state of arousal may vary with each person, depending on the situation or the child's level of affectedness. For both the child and parents, learning how to regulate the child's arousal before it transforms into anxiety is the key to better behavioral control. Unexpected events cannot always be avoided, but having proactive strategies in place can be an effective remedy for parents. Anticipating those situations that may seem exciting and fun to others, but difficult to those affected with FXS, will save the family from behavioral episodes that spoil the fun for the entire family.

Some parents feel that giving information too far in advance only fuels the anxiety engendered by "waiting." The remedy varies, but at the very least, it is important whenever possible to prepare the person with FXS by presenting an agenda, calendar or social story about the upcoming event. Present the remedy in a very calm and non-emotional way, saving the excitement for the actual experience. In the event that the element of surprise cannot be anticipated, an emergency kit with distracters and appropriate escape strategies should always be available as a carefully calculated reactive measure. With understanding and a few simple strategies in place, otherwise difficult situations can be managed successfully, and the family can enjoy happy occasions together.

Functional Behavior Assessment-What is it?

Often when I am consulted about behavior, the first question I ask is, “why do you think he is engaging in this behavior, or what is the function of his behavior?” Explaining what has happened or giving details of the incident in question is not enough because it does not provide the necessary information to solve the problem. I need to know more about why the behavior occurred and less about what occurred.

As I think about the progression of our understanding of behavior and more importantly, how to structure behavioral treatment, I am encouraged that we now view things much differently.

When I first began speaking about the behavioral patterns in those with FXS, I was intrigued by the intention of the behaviors. The ABC model that has now become commonplace among behaviorists, was especially challenging to implement because the antecedent to the behavior was not easily identified. Identifying the antecedent and understanding the function has since formed the cornerstone of sound behavior intervention and best practice with those affected with FXS.

Recently, with the reauthorization of IDEA (Individuals with Disabilities Education Act) there is more emphasis on teaching students with disabilities in the general education environment. Individuals with disabilities are no longer identified by their deficit, but rather by how the system has failed to teach them. Behavioral issues as they present in the classroom cannot be detrimental in accessing a free and appropriate education. Therefore, managing behavior in the classroom has become more comprehensive and requires sophisticated methodology. The challenge is to encourage general educators and specialists to collaborate on ways that the student with disabilities may be more successful in a general education setting. In addition, the general education climate needs to be more conducive to resolving behavioral problems that may interfere with academic progress. The long range goal is for the student to be able to manage behavior in a broader venue such as the community and place of work.

Earlier standards used to identify behavior have been abandoned. For example, the identified behavior may be inappropriate, but the function is not. Defining the function puts to rest antiquated measures of dismissing behavior as inappropriate. We now analyze the behavior with concern for the “reason” or “cause.” Focusing on the topography (what the behavior looks like) yields limited information. The same behavior may have a myriad of causes depending on the student, setting or diagnosis. Therefore, when the function is identified, a more salient and individualized intervention and positive behavior support plan can be developed.

The functional assessment enables the observer to go beyond the symptom to the root of the behavior. This diagnostic feature provides a much richer yield by including in the intervention design a way to remediate the targeted behavior while providing positive support to replace the targeted behavior.

There are number of formats used to assess behavior using an FBA. The amendments to IDEA advise that a functional behavior assessment be provided, but do not require or suggest specific procedures to use while conducting the assessment. There are, however, some steps in this process, which need to be followed in order to properly complete the assessment.

The first step, although fairly obvious, is to identify the behavior. If the definition of the behavior is vague, it is more difficult to systematically count and measure. In addition to defining the behavior in a clear and concise fashion, the behaviors should be observed over time, settings and activities. This allows the team to understand the nature of the behavior as well as to determine the scope as it relates to time or environment. Realizing that some behaviors are influenced by other factors such as hunger, illness or other physical causes is often overlooked. Careful consideration related to specific physical factors must be discussed before determining if the behavior should be targeted for intervention.

After defining the behavior, the function of the behavior can be determined. The function may be to express avoidance, protest, lack of understanding or confusion, sensory discomfort or need to escape. Rarely is the function simply to "misbehave". If we know the function, we can then design a behavioral remedy that will address the function; such as providing a sensory diet, devising a more adaptive way to express protest, or presenting a system by which a need to escape or leave can be signaled.

Learning to define behavior by function will continue to provide for a better diagnostic and effective intervention.

Best Practice in Educational Strategies and Curricula

Marcia L. Braden, Ph.D.

Finding the most effective interventions for students with fragile X syndrome (FXS) can be difficult and often results in a “trial and error” approach. Even though a number of strategies have emerged and have been documented in the literature, the evidence-based interventions are limited. Promising outcomes are continuing to develop using the cognitive phenotype to better understand how to best teach students with FXS.

Too often, effective interventions cited in the literature (what works) are not integrated into Individualized Education Programs, creating a research-to-practice gap. This gap negatively impacts student learning and limits school success. All members of the multidisciplinary team must turn to the literature to guide planning and implementation of educational intervention. Only then will students realize their potential and experience positive learning opportunities.

There are certain curricula that are produced commercially for related populations that have been used with students with FXS. These interventions can be cross-referenced with educational goals and aligned to learning standards.

In order to better understand and apply meaningful intervention, it is necessary to consider the cognitive and behavioral profile of those affected with FXS.

People with FXS can have:

- o Challenges that include: slower processing speed, poor short-term memory, and short attention spans. They can have ADD, ADHD, autism and autistic behaviors, social anxiety, hand-biting and/or flapping, poor eye contact, sensory disorders and an increased risk for aggression. The majority of males with fragile X syndrome demonstrate a range from moderate learning disabilities to more severe intellectual disabilities.

- Strengths that include excellent imitation skills, a strong visual memory/long term memory; they like to help others, are very social, and have a wonderful sense of humor.

Learning Style	Instructional Strategies
Simultaneous Learners	Present the whole word, final product and visual landscape
Incidental Learners	Peer modeling, teaching triad (student with FXS is in group but teacher asks other student questions, side dialogues with others to communicate information to the student with FXS)
Contextual Learners	Teach using a context- language to describe the concept, story line or narrative

Visual Learners Anxious Learners	Use diagrams, videos, demonstrations Provide structured lessons, visual schedules, calendars, calming activities, sameness and predictability
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The reason this information is important is that it forms the basis for intervention and individual educational programming. Individuals with FXS require targeted educational treatment in order to access their abilities. Specific strategies that use strengths to learn is a win for both the individual with FXS and the teaching staff.

Creating an Effective IEP

An Individual Education Program (IEP) is developed for children meeting the criteria for an educational disability. The child is evaluated to determine if he/she is eligible for special education, and then if the team determines eligibility, a plan is written to determine how the child's educational needs will be met. The team must determine that the impact of the disability is significant enough that the child cannot access the general education curriculum without significant support.

The impact statement, which is part of the IEP, forms the basis for goals and accommodations. With a child with FXS, the impact statement should include the cognitive and behavioral phenotype. This means that specific supports and objectives can be written into the IEP in order to meet the needs stated in the impact statement. Many parents are unaware of the significance of the impact statement, so they should ensure the unique features of FXS are included in the impact statement.

Many parents advocate for a FXS specific IEP but may not understand exactly how to address the impact FXS has on their child's learning. Including those features in the impact statement not only allows for the issues of FXS to be addressed but also those unique to a specific child with FXS.

Because hyperarousal can greatly influence an individual's performance, ability to learn, and ability to function independently, relevant information about the causes and effects of hyperarousal should be included in the impact statement.

The IEP is a legal contract between the school district and parents or guardians. The related services necessary to meet the needs and goals will also be determined at the IEP meeting. It is important for parents to consult the Consensus Documents, written by a number of experts in the field, in order to advocate for their children. Starting with a good learning environment, specific educational strategies that use strengths to address weaknesses and incorporate behavioral remedies will ensure the child's access to meaningful educational intervention.

Using Interests to Motivate Learners

It has long been noted that individuals with FXS remember details over time and are often prompted by an object, location or person to recall details about a past event. In addition, they are able to identify a number of interests that they spend time talking about and use to connect with others.

There are a number of ways to structure learning lessons that incorporate high interest materials. For example, reading can be taught using super heroes, or movie and television characters. Matching names to pictures and then expanding to matching phrases to pictures promotes engagement. Their visual memory strengths can be enhanced when high interest materials are utilized. Using high interest materials will bring immediate success when so many prior academic endeavors have failed. This level of engagement builds confidence in the learner.

Teaching math to individuals with FXS is difficult due to a number of issues. Math is sequential and builds on sequential memory. As is documented in the literature, the learner with FXS does not process sequentially and lacks sequential memory. Many aspects of math require memory of unrelated facts and often do not include a context as is the case for reading. It is often best practice to teach math in a simultaneous fashion using math to solve real life problems. The focus on functional math skills can provide the context to make a purchase, set a timer, or measure a quantity in order to follow a recipe. Using activities of interest like cooking can provide motivation to learn math skills that would normally be lost.

Individuals with FXS often struggle with motor planning and visual motor deficits. Those deficit areas make handwriting very difficult and frustrating. Using programs that utilize a context such as the writing strand of the Logo Reading program along with commercially made curriculum Handwriting Without Tears (HWOT), can help to build writing skills. Telling a story (Logo Reading) or providing verbal prompts (HWOT) provides a context from which to learn how to form letters and draw.

Providing a Positive Learning Environment

The environment is the easiest thing to change and can have a huge impact on behavior as the neurobiology collides with the environment. Changing the environment can support learning by providing predictability and reasonable outcomes. It is important to assure the learner that taking risks will be supported and academic struggles will be scaffolded with visual supports.

The teaching staff can also encourage learning by aligning with the student with FXS to know when they need help and how to improve the outcome. Research indicates that engagement of elementary school children with FXS is strongly related to the classroom environment and instructional quality of the teachers. The ways the teachers structure and arrange the classroom environment is much more important to student engagement than specific aspects of the child's FX status, medication use or dual diagnosis (Symons, Clark & Roberts 2001).

There are a number of sensory needs that may also need attention in the classroom. Providing sensory supports can have a positive effect on the educational process. It is

always critical to utilize a multidisciplinary approach and to consider the cognitive profile whenever implementing any strategy.

Advocating for an appropriate educational program whether it be in the school system or through the transition to the world or work, requires an understanding of best practice and allows for more success in the process. There is now good research that supports anecdotal observations from therapists and teachers to request specific intervention and academic strategies to better meet the needs of those with FXS. With these supports and curricular adaptations, people with FXS will be more able to reach their full potential.

Resources

- www.marciabraden.com
- www.autismtasks.com/index.html
- www.greenhousepub.com
- www.pinterest.com/drtarajohnson/aba-teacch-file-folder-and-work-box
- www.pinterest.com/drchrisreeve
- *Handwriting Without Tears (HWOT)* - <https://www.hwtears.com/hwt>
- *Essential Sight Words* - Edmark - <http://www.proedinc.com>
- *Math Triumphs* can be purchased from many major outlets including MacMillan, Amazon, and Glencoe
- *Read Naturally* - <https://www.readnaturally.com/>
- Hands on play application - <https://www.playosmo.com>

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