A Parent's Introduction to Fluency

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Defining the terms

Children with autism continue to receive great help because they learn through instructional arrangements from behavior analysis. Behavior analysis offers these children, and many others, the benefit of receiving instruction based on a long history of solid lines of research and consistent underlying theory. Those same lines of research and underlying theories have recently encouraged the addition of a "new" component to the programs of children with autism that many parents are hearing about — "fluency." I placed quotation marks around the word new in the previous sentence because I wanted to stress that the concept of fluency is not new in behavior analysis, even though it is only recently that it has received so much attention for children with autism. Before we talk about how the addition of fluency building may enhance children's programs, we should spend a bit of time talking about what the term means, because various people use the term to mean different things.

As I will discuss it here (and in the next article in this series), fluency refers to a level of skill development. It is a metaphor that describes how well a child has learned a certain skill. When children learn skills to fluent levels, they can use the skills effortlessly, automatically, and "without thinking." They learn skills so solidly that they can easily go on and use those skills to learn other, more advanced skills. Fluency is a good thing! And children should learn any important skill to fluent levels, as well as any other basic skills they will need to know to go on and learn something else.

The Benefits of Skill Fluency

I mentioned that we should consider fluency as a metaphor, meaning that we have no way of looking at any given skill and determining whether the skill is or is not fluent based only on that observation. Rather than simply observing to decide whether a skill is fluent, we must measure specific aspects of the child's performance of the skill. As a metaphor, fluency describes a high level of skill mastery associated with certain outcomes. When a skill is fluent, that skill is retained, applied, stable, and endures. If we wish to determine whether a child

has learned a skill to the point of fluency, we must test the skill to ensure that the child remembers it (retention), applies it (application), uses it under highly distracting conditions (stability), and uses it for long periods of time without fatiguing (endurance).

Because children with autism need to learn so many basic skills (such as basic skills associated with taking care of themselves, communicating, and interacting with other people), it is especially important that we continue teaching until those skills are truly fluent. Consider what would happen if we taught children with autism to label common household items receptively during instruction, but they could not perform that skill after we stopped (a lack of skill retention). How frustrating it would be for students to learn to answer basic informational questions about themselves, but then be unable to do so for a long enough time that they could hold a basic conversation with their friends (a lack of skill endurance). Or, how disappointing it would be for children and their families if the children could expressively label pictures of different family members during instruction, but they could not do so looking at the family photo album (a lack of skill stability). Imagine the frustration of students with autism if they learned the concept of a triangle through instruction, but could not identify a new triangle when their teacher presented one (a lack of skill application).

Measurement in Fluency-Based Instructional Programs

If we want children to remember, apply, and generalize skills(that is, use skills with different people and in different places), teaching those skills until they are truly fluent helps ensure this will happen. To help ensure that children will enjoy the benefits associated with fluency, we must pay careful attention to how we measure while we teach. In most traditional instructional programs for children with autism, teachers and clinicians measure skills by looking at how accurately the child performs a skill. Once a child learns a skill to a certain level of accuracy (usually a relatively low level of accuracy such as eighty percent), the teacher or clinicians stops instruction on the skill and moves on to the next skill.

Monitoring learning using measures that only take into consideration skill accuracy, such as percent correct, is fine if such measures predict those crucial outcomes of mastery we discussed earlier (skill retention, application, stability, and endurance). Unfortunately, accuracy measures alone do not predict those important outcomes. To increase the likelihood that we will teach children skills to fluent levels, we should not measure accuracy, but rate.

Rate refers to some amount of correct and incorrect responding per some unit of time, and best predicts skill retention, application, stability, and endurance. The fact is that to be truly fluent at a particular skill, a child must respond both accurately and quickly. High rates of accurate responding and low rates of inaccurate responding are the hallmarks of truly competent performance. In most fluency-based instructional arrangements, teachers and clinicians look at rate per minute — the number of correct and incorrect responses a child emitted during a minute-long interval.

Frequency Aims as Benchmarks

When we measure rate, we also measure accuracy at the same time. We measure both without any additional effort. For example, if we timed a student for one minute as they expressively labeled pictures, we might count 20 correct answers and two incorrect answers. We could convert this to an accuracy measure of 91% (20 correct answers divided by 22 total answers yields an accuracy of 91%). Under traditional teaching approaches, we might stop instruction at this point. The high rate seems like pretty good performance! When we seek to teach children skills to fluent levels, however, we strive to keep teaching until the student performs the skill not only accurately, but also quickly.

While 20 correct answers and two incorrect answers may be very accurate, it is also rather slow performance for this task. The student is unlikely to enjoy the benefits of fluent performance — skill retention, endurance, stability, and application — at such a low rate of correct responding. Because of the importance of both accuracy and speed, we would continue practicing this skill until the student could perform at least as accurately, and could do so quicker. With our example of expressively labeling pictures, we would continue teaching the skill until the student could say approximately 50 to 55 correct answers within a minute with no more than one error. At that point, we would systematically test to ensure the skill would be remembered, would endure, would be stable, and would be applied by the student. Only after we showed these outcomes in the student's performance data would we say the skill is fluent and move on to teach the next skill.

Ensuring that we teach skills to fluent levels helps ensure we give our students the gift of real, long-term learning. We help ensure that we will not need to restart instruction on the skill at some point in the future because the child "lost" it, and we help ensure the student can use the skill in their everyday lives.

Now that we have talked about the concept of fluency and the importance of rate in attaining skill fluency, in the next issue of T*he OARacle*, I will discuss critical features of programs that incorporate fluency building. Specifically, I will identify a list of features that parents may use to help them determine whether or not their child's intervention program is structured to help ensure that their child develops skills to fluent levels. I will also present a list of suggested frequency aims parents might use, in concert with their child's attending behavior analyst, as benchmarks for performance.

A Brief Review

Introduction to the Second Article in the Series

In the last issue of *The OARacle*, I introduced the term fluency: a metaphor for a high level of competency in any given skill. When children learn skills to fluent levels, they remember the skills, they can use the skills for long periods without fatiguing, they can use the skills under the busy and distracting conditions of daily life, and they can apply the skills to untaught examples. Unlike many instructional programs that only measure accuracy (percent correct), when

we seek to teach children skills to the point of fluency, we measure how quickly they respond under timed conditions. We measure the children's rate of responding. We continue measuring their rate and we continue teaching until the children answer not only accurately, but also quickly.

The Components of Programs that Develop Skill Fluency

Now that we have discussed what fluency is and how we measure it, let us turn our attention to the features an instructional program would need to have for the program to teach skills to fluent levels. While teaching to fluency may be the goal in any instructional program, reaching that goal is much more likely if the program contains certain components. Though the following descriptions of the components of good fluency programs will not be extensive enough to allow you to develop a fluency-building program for your own child, they should provide you with a basic understanding that will help you guide your child's instructional program. If you wish to incorporate fluency-building procedures into your child's instructional program, I recommend that you work closely with a Board Certified Behavior Analyst (BCBA).

Component 1: Building accuracy first

The first component of a quality fluency-based instructional program involves teaching children new skills until they can perform the skill accurately. Before we build speed, we establish accuracy. When we establish accuracy, though, we do so only on parts of an instructional program rather than the whole program at one time. For example, if we wanted to teach a child to imitate our actions (known as gross motor imitation), we might begin by identifying one set of four actions to teach the student. Once we identified the actions, we would use established and well-researched instructional procedures to teach the child to imitate accurately those four actions. For example, we might us Discrete Trial Instruction as our instructional method for teaching the student to imitate the four actions accurately. Once the child could imitate those four actions accurately (at around 90 percent accuracy), we would move those four actions out of the accuracy-building phase of instruction and into the timed practice phase. While the first four actions were in the timed practice phase, we would identify the next set of new actions and teach the child to imitate those new actions accurately.

Component 2: Daily practice under timed conditions

Now that the child can imitate the first set of four actions accurately, we would instruct the student to practice imitating those actions at a faster rate. To arrange such a practice, we would use a digital timer and set it so that the timer would count down. As a general rule of thumb, the smaller the number of items the child practices and the younger the child, the shorter the timing interval we would select.

To continue with our example, we might only set the timer for six seconds because the child would only be practicing the four actions they could imitate accurately. After we started the timer counting down from six seconds, we would have the child imitate as many of those four actions as they could before the timer reached zero. Each day, we would practice repeatedly with the child until the student could imitate more actions than they had the previous day in the same amount of time. By asking the child to imitate more actions on subsequent days than he or she imitated on previous days, we would build the child's rate of correct responding.

When the next set of actions that we taught the child to imitate accurately was accurate we would add those four actions to the set the child used during timed practice each day. In this way, the actions that the student practices getting faster with always grows as we add new actions to the set.

Component 3: Charting and decision-making

As important as it is that we practice with children each day until they can perform more quickly than they did the previous day, it is also important that we graph the child's best performance each day. When we graph the data we collect on a child's performance, we make better decisions about how to change our teaching to meet the child's ever-changing needs, we use the child's data more frequently to make decisions, and we document the effectiveness of our teaching methods.

Fluency-based instruction grew from an area of behavior analysis called Precision Teaching. When we strive to teach children skills to a fluent level, we use a special kind of graph called the Standard Celeration Chart (SCC). The SCC is the same graph that is used on Precision Teaching and was developed by Dr. Ogden Lindsley, a renowned behavior analyst and teacher. The SCC is the only chart appropriate for use in fluency building instructional programs. While the SCC uses procedures for graphing that are beyond the scope of this article, there are several resources you can access to learn ~~the~~ how to correctly and easily use the SCC to chart your child's progress on any skill. I have listed some additional resources related to the SCC and Precision Teaching at the end of this article.

Component 4: Teaching until the child reaches frequency aims

Because we use timed practice each day to help children get faster at doing what we teach them, and we use the SCC, we can set performance aims for students. These performance aims describe how fast (the frequency) the child should respond before he or she will likely enjoy the benefits of fluency (retention, endurance, stability, and application). We call these performance standards frequency aims. Below I have listed recommended frequency aims for many of the skills children with autism commonly need to learn. While these frequency aims do not guarantee that children will enjoy the benefits of fluent performance, the aims are based on a solid amount of research that suggests

that once children achieve the suggested frequency aims, they will remember, and apply the skill, as well as use the skill for long periods without tiring, and in distracting situations.

Skill Areas	Recommended Frequency Aim
Imitations skills such as: • Gross motor imitation • Fine motor imitation • Imitation of sounds, sound patterns, words, and sentences	30-35 corrects per minute and 0-1 errors per minute
Receptive language skills such as: Identifying nouns Following directions Identifying actions Identifying categories, functions, and features of objects Answering informational questions	30-35 corrects per minute and 0-1 errors per minute
Expressive Language skills such as: Identifying nouns Following directions Identifying actions Identifying categories, functions, and features of objects Answering informational questions	50-55 corrects per minute and 0-1 errors per minute

While I certainly did not list all of the skills students with autism should learn, the skills I included are among those that children in intensive in-home programs often need to learn. Through years of applied research, clinicians have also identified frequency aims for skills in other areas such as motor skill, reading skills, writing skills, and math skills.

Component 5: Testing the outcomes of fluent performance

We should not only arrange for children to practice the skills they learn until they can perform the skills at the frequencies the above table suggests, we should also systematically test to ensure that the vital outcomes of fluent performance of a skill (retention, endurance, application, and stability) actually occur. When we evaluate skill retention, we stop all instruction and timed practice on the skill for one month. After one month, we have the child complete two timings with the same materials. If we see that the student matched or surpassed their previous best performance, then we can safely say that the child's performance showed skill retention.

When we evaluate skill endurance, we lengthen the timed practice for one or two timings so that we can determine whether a child can sustain their high rate of correct responding across significantly longer timing intervals. To test for skill endurance, we might double or triple the length of the timings. If we see that

the student can indeed sustain their responding across longer timing lengths, then we have demonstrated that the child's performance shows skill endurance.

We evaluate skill stability by arranging for a child to complete timings in the presence of distracting events such as people entering and leaving the area where the child is working, turning on a the child's favorite movie or cartoon, or changing where we do the timings. If we see that the child performs just as quickly and accurately even when such distractions are present, then we have demonstrated that the student's performance shows skill stability.

Finally, we can evaluate skill application by determining whether a student can respond just as quickly when we present them with all new examples that the child has never before seen. If we were testing the application of a child's gross motor imitation skills, we would present the child with actions that we had never used during either accuracy building or timed practice. If the child could copy those new examples at the frequency aim for gross motor imitation (30-35 correct per minute with no more than one error), then we would be confident that the student's gross motor imitation showed skill application.

Resources related to fluency-based instruction and Precision Teaching:

Instructional CD-ROMS

- TUCCi Learning Solutions (www.tuccionline.com)

Books

- *Standard Celeration Charting 2002* by Steve Graf and Ogden Lindsley available from Graf Implements, 7779 Lee Run Road, Poland, Ohio, 44514-2510, electronic mail: zerobros@aol.com

Websites

- Precision Teaching on-line instructional module from Athabasca University. Available online at: http://psych.athabascau.ca/html/387/OpenModules/Lindsley/
- Precision Teaching papers available online at http://www.teonor.com/ptdocs/
- Papers related to the application of Precision Teaching with children with autism available online at: http://students.washington.edu/fabrizio/Michael%27s%20Bio.htm
- General information about Precision Teaching available at http://www.celeration.net

Parents may find more information about the certification of behavior analysts by accessing the Behavior Analyst Certification Board website. The website describes the certification process and also provides a list of certified professionals in its certificant registry.