

A Review of Evidence Based Educational Interventions for Autism for Parents

Michael Miklos PATTAN
Autism Initiative ABA Supports



The evidence that parents need...

- Outcomes relative to their lives and the lives of their child:
 - Greater independence for their child
 - For the child to reach their full level of potential
 - Individual happiness for all family members
 - Reduction or elimination of any problem behavior
 - Ease of implementation

Parents and Schools

- This session will focus on educational programs for students with Autism Spectrum Disorders
- Of course there is a lot more to life and Autism Spectrum Disorders
 - Diagnosis
 - Medical treatments
 - In-home programming or in-home interventions
 - All of those things that need done on a daily basis.....

Mark Twain: "Don't let schooling get in the way of your education!"

Education and Evidence

- The educational system is established to assist all students in being productive members of society and to demonstrate citizenship skills allowing effective participation in our society and democratic process
- School based instruction should provide demonstration of such outcomes
- Providing measureable outcomes is part of IDEA and Chapter 14 in PA

Commonality of Effective Interventions

- Outcomes rely on practical action: talk is not enough
- Effective instruction needs to address meaningful skills
- Individualization is key
- Outcomes must be verified

So where do the interventions that promote such outcomes come from?

Two Sources of Evidence

1. Interventions selected from sound science-based evidence:

- Scientific findings published in peer reviewed journals
- Large scale comparison studies with random assigned control group
- Repeated demonstrations of single subject design studies

2. Individual demonstrations of the effectiveness of an intervention: Did it work with this individual?

Evidence is a funny word

- Outcomes for the individual learner are what matter the most
- This does not mean that all interventions are equal or should be selected based simply on preference
- But, there is no certain evidence: just closer approximations

“Many interventions exist for autism spectrum disorder (ASD). Yet, scientific research has found only some of these interventions to be effective. The interventions that researchers have shown to be effective are called evidence-based practices (EBPs). One reason for using EBPs is because, by law, teaching practices must be based on evidence of effectiveness.”

Wong, C., Odom, S.L., Hume, K., Cox, A. W., &Fettig, A., Kucharczyk, S., Brock, M. E., Plavnick, J.B., Fluery, V.P., & Schultz, T. R. (2014). Evidence-Based Practices for Children, Youth, and Young Adults with Autism Spectrum Disorder. Chapel Hill: The University of North Carolina, The Frank Porter Graham Child Development Institute, Autism

Some Summaries for Effectiveness of Autism Treatments (EBPs)

- American Academy of Pediatrics (2007)
- American Psychological Association (2017)
- American Society of Child and Adolescent Psychiatry (1999)
- United States Surgeon General, US Department of Health and Human Services (1999)
- National Autism Center, National Standards Report 1 and 2 (2009, 2015)
- Maine Departments of Health and Human Services and Department of Education, Children's Services Evidence-based Practice Advisory Committee (2009)
- The Missouri Autism Initiative, Missouri Department of Mental Health (2012)
- The New York State Department of Health (2017)
- University of North Carolina, Frank Porter Graham Center (2014)

- Findings developed by an expert review panel, “based on a thorough review of the educational and behavioral treatment literature that targets the core characteristics and associated symptoms of ASD that was published between 1957 and the fall of 2007. This was the largest meta-analysis of its kind published up until that time.
- Identified eleven ‘established’ treatments: treatments that produce beneficial outcomes and are known to be effective for individuals on the autism spectrum. The overwhelming majority of these interventions were developed in the behavioral literature (e.g. applied behavior analysis, behavioral psychology, and positive behavior support.)”

Conclusions:

- Approximately two-thirds of the Established Treatments were developed **exclusively** from the behavioral literature (e.g., **applied behavior analysis**).
 - Initially reviewed 7,038 abstracts of research
 - Rigorous review process led to a total of 775 studies being retained for final analysis
- Of the remaining one-third of the Established treatments studies are derived **predominantly** from the behavioral literature.
- This pattern of findings suggests that treatments from the behavioral literature have the strongest research support at this time

Applied Behavior Analysis

- It is not a “protocol” or a “thing”
- ABA is a process and conceptual system that can be used to guide decisions regarding any behavior change programs
- Teaching is, without a doubt, a behavior change program
 - Students should behave differently as a result of education
 - ABA allows a systematic approach to instruction

The Dimensions of ABA (Baer, Wolf and Risley, 1968)

- Applied
- Behavioral
- Analytical
- Technological
- Conceptually Systematic
- Effective

Published in the first issue of the Journal of Applied Behavior Analysis, 1968

ABA: The Basic Model

- Antecedent
 - Motivation (MO) and events that guide responding (Sds)
 - Prompts for teaching purposes
- Behavior
 - Observable and measureable (more complex than it sounds)
- Consequence
 - Things get better (reinforcement)
 - Things get worse (punishment)

Language as behavior

- ABC's of speaker and listener skills
 - **mand** (request), **tact** (expressive labeling), **echoic** (verbal rehearsal, repeating what is said), **intraverbal** (answering questions, filling in the blanks, word associations, etc)
 - listener response, imitation and echoic
- Basic ABCs function like atoms: they combine to make complex language interactions possible
 - Joint control as an example

Joint Control Procedure

1006

K.G. Cassin et al. / Research in Autism Spectrum Disorders 7 (2013) 997–1011

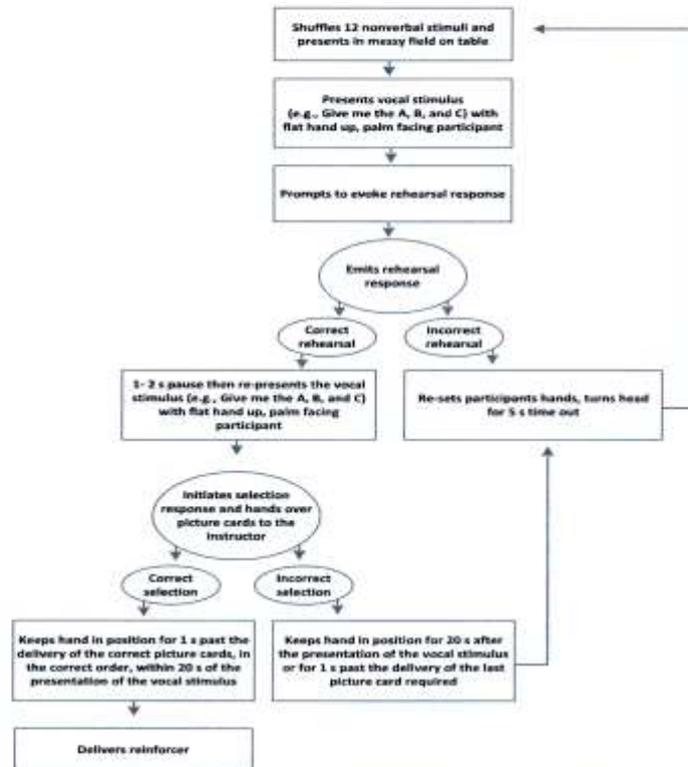


Fig. 3. Overview of joint control training and error correction procedures. Squares indicate a description of teacher behavior, ovals indicate a description of participant behavior. Arrows indicate the sequence of instruction.

within and across sessions until self-echoic or self-mimetic responses were emitted independently. These practice trials were conducted until participant responding achieved the mastery criterion of four out of five trials with accurate and independent echoic and self-echoic or intraverbal and self-mimetic responses within one session. Once this mastery criterion was achieved, the joint control training procedures described above resumed.

The evidence base is not that simple...

- The large scale outcome evidence literature is still quite limited
- Even the most established treatments are not universally established
- The limitations and extent of effectiveness for established interventions are not yet clear
- The individual learner's particular history alters the applicability of various protocols

Teaching isn't research; it is engineering

“ Both medicine and engineering do use scientific knowledge and methods to solve relevant problems, but neither of them is an applied science. In fact the practices of medicine and engineering are more like each other than either is like unqualified science: medical doctors and engineers both welcome all relevant science they can muster, but neither can wait for complete scientific understanding before acting to save a life or create a new life saving machine.”

Henry Petroski 2010, *The Essential Engineer*, preface.

So what should parents do to insure effective educational programs?

Be Informed! Participate!

- Be aware of effective instructional processes
 - Evidence, protocols, and analysis
- Share your knowledge of your child
 - Preferences
 - Skills
 - Areas of need
- Work cooperatively with the educational team
- Question what needs questioned
- Celebrate successes with your team!

Protocol and Analysis

- The evidence-base addresses protocols: set procedures for implementing an intervention
 - Set protocols allow “replicability”
 - Teachers can answer question “how do you do it?”
- Analysis, a process to determine:
 - If the protocol is working
 - What variables are related to the relative level of success
 - Comparison of performance to some decision making format

Some basic steps

- Whenever possible elect interventions from established evidence
 - If clearly established evidence not available, select intervention from a model consistent with evidence (basic principles, data system)
- Interventions should be selected that are in line with current evidence (Maine report, 2009):
- Early Intensive Behavioral Intervention | *ESTABLISHED EVIDENCE*
- Applied Behavior Analysis for Adaptive Living Skills| *PROMISING EVIDENCE*
- Applied Behavior Analysis for Communication| *ESTABLISHED EVIDENCE*
- Applied Behavior Analysis for Social Skills| *ESTABLISHED EVIDENCE*
- Applied Behavior Analysis for Vocational Skills| *PRELIMINARY EVIDENCE*
- Applied Behavior Analysis for Academics| *PRELIMINARY*

Some basic steps

- Assessments and program design need to be practical
 - Focus on skills that are useful
 - Social communication!
 - Lead to independent life skills, employability, or access to post-secondary education
 - The delicate balance of “academics” (“Can name saturn, but can’t tie shoes”, Ayres et al, 2011)
 - Describe not only the skill that the student will acquire but the conditions under which it will be demonstrated
 - Have a clear sequence of skills
 - Include a clear description of how the skills will be taught
 - Allow for measuring progress, making changes based on progress monitoring
 - Are “doable”: they can be implemented in the appropriate circumstances

Some interventions with insufficient evidence (Maine Report, 2009)

- DIR/Floortime| *INSUFFICIENT EVIDENCE*
- Relationship Development Intervention (RDI)| *INSUFFICIENT EVIDENCE*
- Auditory Integration Training| *INSUFFICIENT EVIDENCE*
- Sensory Integration Therapy| *INSUFFICIENT EVIDENCE*

Some other interventions with insufficient empirical support

- Social stories (note the requirement of rule-governed behavior); insufficient evidence (Maine Report)
- TEACCH; insufficient evidence (Maine Report)
- Weighted vests (Reichow, et al. 2010; Cox, et al. 2009)
- Ambient prism lenses (Chok, et al., 2010)
- Advanced warnings and activity schedules to reduce problems with transition (Lalli, et al. 1994; Wilder, et al., 2006; Wilder et al. 2010)

Be wary!

- If it sounds too good to be true, it's probably not
- Be careful of testimonial evidence/anecdotes/personal experience
- The results occur first in the media
- Lack of replicability
- Claims of repressed or hidden results
- Personal benefit/conflict of interest
- Simplistic conclusions from complex studies

adapted from: "When should I be skeptical?", Ryan Butler, Autism Speaks, www.autismspeaks.org/blog/2012/09/07/when-should-i-be-skeptical

Some general evidence based
principles for effective education

PATTAN: Research-Based Effective Teaching Principles

- Students learn more when they are actively engaged in instructional tasks.
- High success rates correlate positively with student learning outcomes.
- The more content covered, the greater the potential for student learning.
- Students achieve more in classes where they spend most of their time being directly taught by a teacher.
- Students become independent, self-regulated learners through instruction that is deliberately and carefully scaffolded.
- The critical forms of knowledge (declarative, procedural, and conditional) must be addressed in order for instruction to be effective.

PATTAN: Research-Based Effective Teaching Principles

- Learning is increased when teaching is presented in a manner that helps students to organize, store, and retrieve information.
- Strategic instruction helps students to become critical thinkers.
- Teachers can increase their students' achievement through instruction that is explicit.
- By teaching sameness both within and across subjects, teachers promote the ability of students to access knowledge in any problem-solving situation. (concept formation)
- Using formative assessment as a diagnostic tool can help teachers make the necessary adjustments to their practices to meet the individual needs of students.
- Teachers can gain more class time for academic instruction by directly teaching classroom behavioral expectations and routines to students.
- Students achieve greater success when supported by intentional and intensive family engagement.

Data and Consumer Rights

- Parents, teachers, other professionals, and funding agencies have the right to hold prospective providers accountable for delivering quality services (e.g., to ask them how they use objective data to plan, implement, and evaluate the effectiveness of the interventions they use).

» ABAI Autism SIG revised consumer guidelines

Team Functioning

- Ongoing Communication
- Focus on skills
- Focus on protocols
- Have a plan to respond to data
- Discuss details such as:
 - Where, when, who, how long?

Simple Communication

Time Spent	Content Area	Skills Mastered	Skills Introduced	Notes
9:00-9:30	Intensive teaching	Tact Prepositions: over and on Intraverbal class: chair is furniture	Tact prepositions: in front and behind Intraverbal class: coach is furniture	
10:00-10:20	Reading Mastery	Lesson 52	Will start lesson 53 tomorrow	

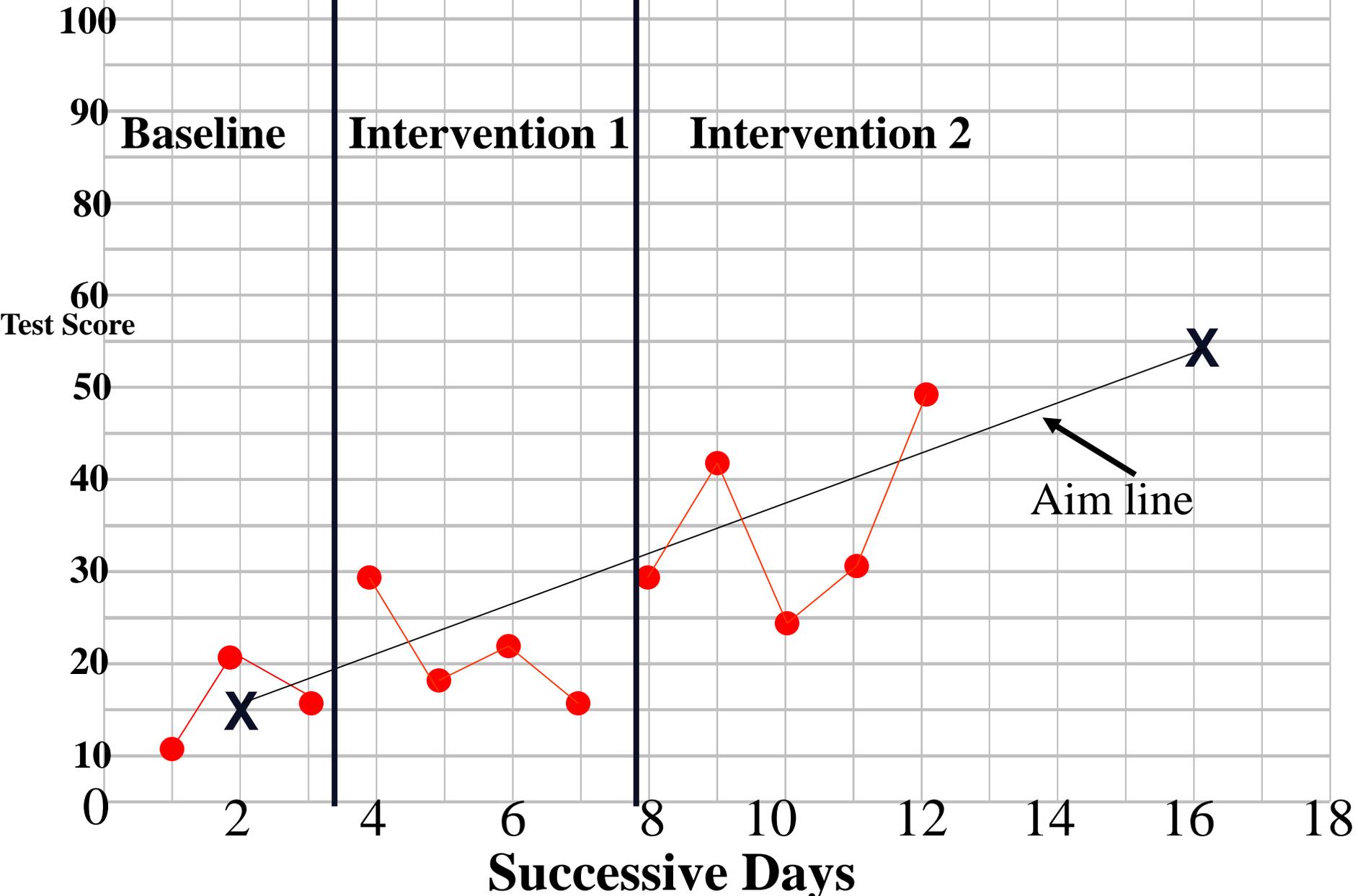
Helping Parents Understand Data

- Be aware of skill sequences
- Learn what has been mastered
- Look at a graph! (teachers will need to provide them!)
 - It provides a summary of progress in a nutshell!

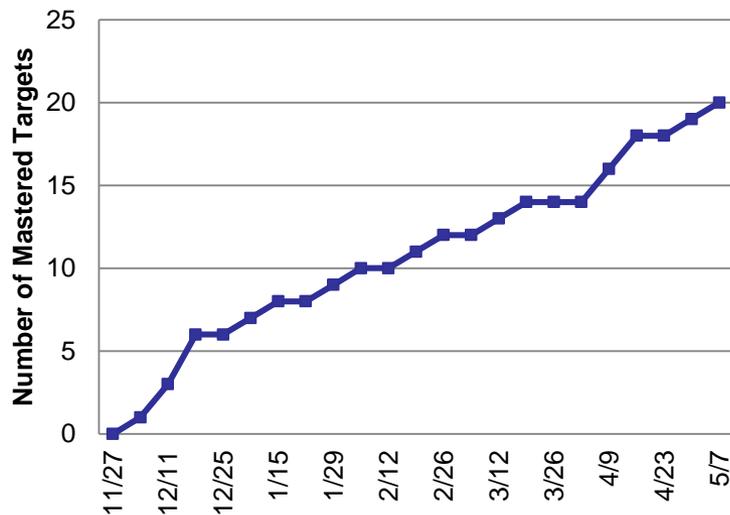
Data: a tool

- Data systems should be relatively simple and efficient
 - Beware of systems that interfere with instruction
 - Only take data on what you will use
- Frequency and Rate
- Probe
- Mastery
- Duration

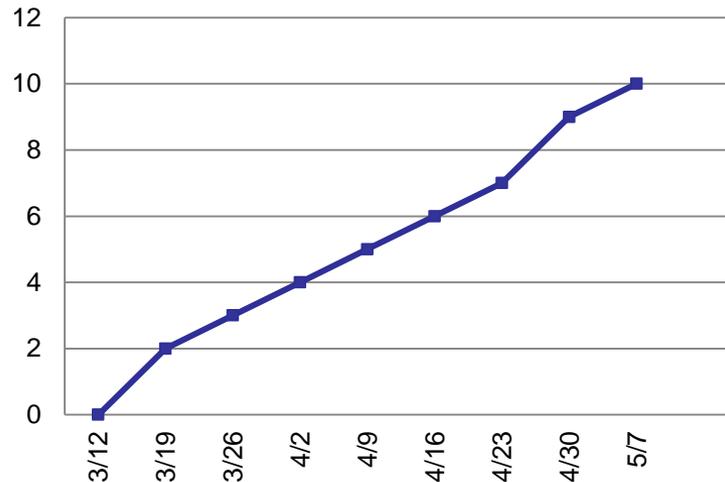
Example: Decision Rules



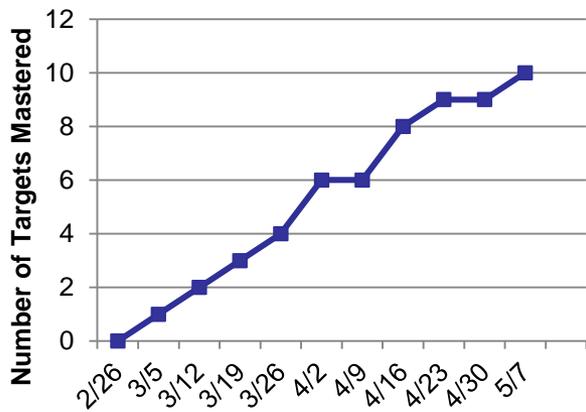
Dylan: Cumulative Mand



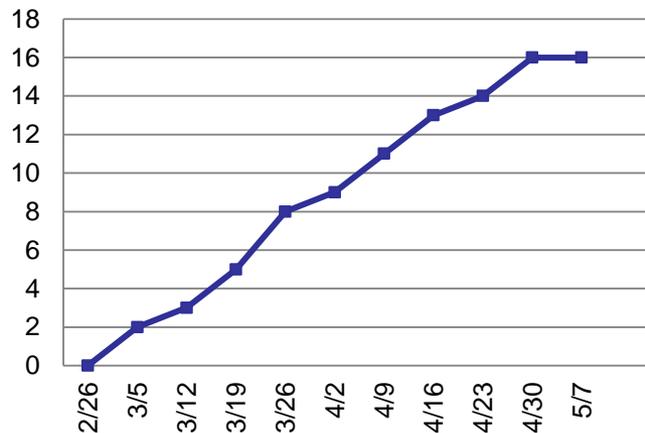
Dylan: Cumulative Tacts



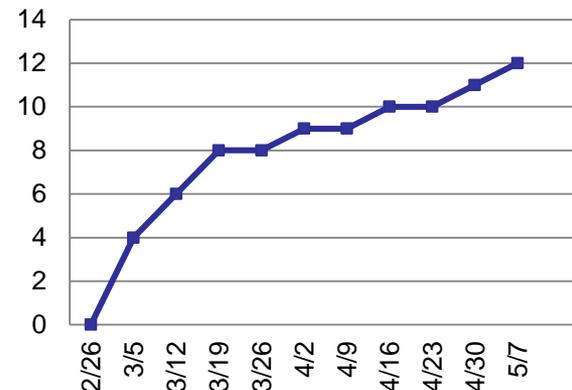
Dylan: Cumulative Echoic Skills



Dylan: Cumulative MTS Skills



Dylan: Cumulative Imitation Skills



Total Cumulative Skills in 20 weeks: 68 (20 Mand)

The Analysis: Functional Relations

- As noted, graphs are very valuable
 - They allow a quick check of how a program or intervention is working
- Tests to determine if things are working:
 - If I change the way I teach, does it consistently change what the student does?
 - Does the intervention function to change the path of behavior?

Addressing Problem Behavior: Logic of Best Practice Designs

Pair Teaching with Improving Conditions

(Carbone, et al. 2012)

- Pair instruction with positive reinforcement
- Fade in demands gradually
- Low response effort at first
- Immediate delivery of reinforcement
- Reduce learner errors
- Fast paced instruction (short time between trials)
- Intersperse easy/hard tasks
- Mix and vary instructional demands
- Teach to fluency

Evidence and Interventions to Reduce Problem Behavior

- Aggression and self injury, along with other problem behaviors, are common in individuals who present Autism Spectrum Disorders and other developmental disorders.
- There is much that is not fully understood about these behavior patterns nor are there any easy answers in many cases.
- There are, however, systematic approaches that are powerful and are evidence based
- At any rate, solving these problems involves careful attention to detail, teamwork, and persistence and patience.

Making Behavior More Predictable

- Requires understanding of patterns of responses
- Across time and conditions
- Patterns are not always easy to see
- Requires systematic observation
 - Count or measure behavior
 - Relate the behavior to events in environment

Critical Components of Effective Behavior Plans (Brian Iwata)

- Reduce motivation for problem behavior
 - Make it so they don't want to do it!
- Teach a skill that is appropriate and accomplishes the same thing
 - Make it so they don't need to do it!
- Use extinction if problem behavior occurs
 - Make doing it ineffective and inefficient

All three steps are based on “Function”

- Function = reinforcement
- Reinforcement: a consequence that increases the future probability of behavior
 - Both positive and negative reinforcement increase behavior
 - Not all consequences are reinforcers (Brian Iwata: the sneeze effect)

Reducing Problem Behavior for

“Escape” CMO-R(Carbone, 2010)

- Pair instruction with positive reinforcement
- Fade in demands gradually
- Low response effort at first
- Immediate delivery of reinforcement
- Reduce learner errors
- Fast paced instruction (short time between trials)
- Intersperse easy/hard tasks
- Mix and vary instructional demands
- Teach to fluency

Meltdowns and Communication

- Teach flexibility
- Teach in the condition in which problem behavior occurs
 - Ready hands, wait, transition, gives up reinforcers, accepts no
- Effective mand behavior
 - Many meltdowns involve defective mands

Considerations in Evaluating Interventions

- Is intervention being done correctly?
- Is intervention being done consistently?
- Is instruction (concepts/stimuli) arranged faultlessly?
clear examples/non-examples across irrelevant variables
- Is intervention being done often enough?
- Is data accurate?
- Is enough time allotted to do the intervention?
- Are interventions procedures clearly stated?
- Are staff able to adjust prompt level and reinforcement on a moment to moment basis?

An example of educational programs guided by both EBPs and student level evidence:

PATTAN's Autism Initiative ABA Supports

Key Considerations in Effective Educational Practices for Students with Autism

- Classroom Organization and Management
- Systematic Training and Consultative Support
- Inclusive Practices
- Effective Instruction
- Treatment integrity
- Social Skill Instruction
- Effective Positive Behavior Support Plans
- Family Involvement

Site Review: ABA Supports

- Main criteria for evaluating implementation of evidence based practice resulting from consultative efforts
- Tied to effective teaching/evidence based practice
- Implementation criteria is rigorous and reliable(IOA data over 93% over 10 year period)
- SLO relation: site review criteria to average performance of students

Site Review: Overview

- Classroom Organization
 - Schedules
 - Classroom environment
 - Materials
 - Data: student notebooks
- Consultation/Training
- Inclusive Practices
- Family Engagement

Site Review: Overview (continued)

- Instruction
 - Mand
 - Intensive teaching
 - Natural Environment Training
 - Vocal training
 - Direct Instruction and group instruction
 - Fluency
- Behavior Interventions to reduce problem behavior
 - FBA
 - Implementation (data, treatment integrity, implemented as written, staff training, etc)
 - Plan design (reduce motivation, teach competing response, extinction)

Systematic Instruction

- Identification of meaningful goals that are socially valid (what to teach).
 - Communication skills- Requesting wants and needs
 - Social Skills-Initiating and responding to social bids
 - Appropriate play/leisure skills
 - Self-help, completing independent activities

Program Components Fit Together



Skills Needed by School Personnel to Implement Effective Practices in Autism Support Programs

- Skilled management of social and physical environments to allow effective instruction
- Assessment skills
- Ability to monitor progress through data organization and analysis
- Consistent skill in delivering instructional protocols
- Dynamic responsiveness to student performance

Teachers of Students with Autism Benefit from Effective Consultation

- Consultation provides ongoing support and allows transparency
- Provides systematic feedback
- Effective consultation focuses on:
 - instructional behavior
 - teacher responsiveness to data systems
 - analysis of the many variables that can affect student outcomes
 - Motivating teachers and staff
- It helps teachers be aware of when to make changes

Skill Tracking and Graphs:2016-17

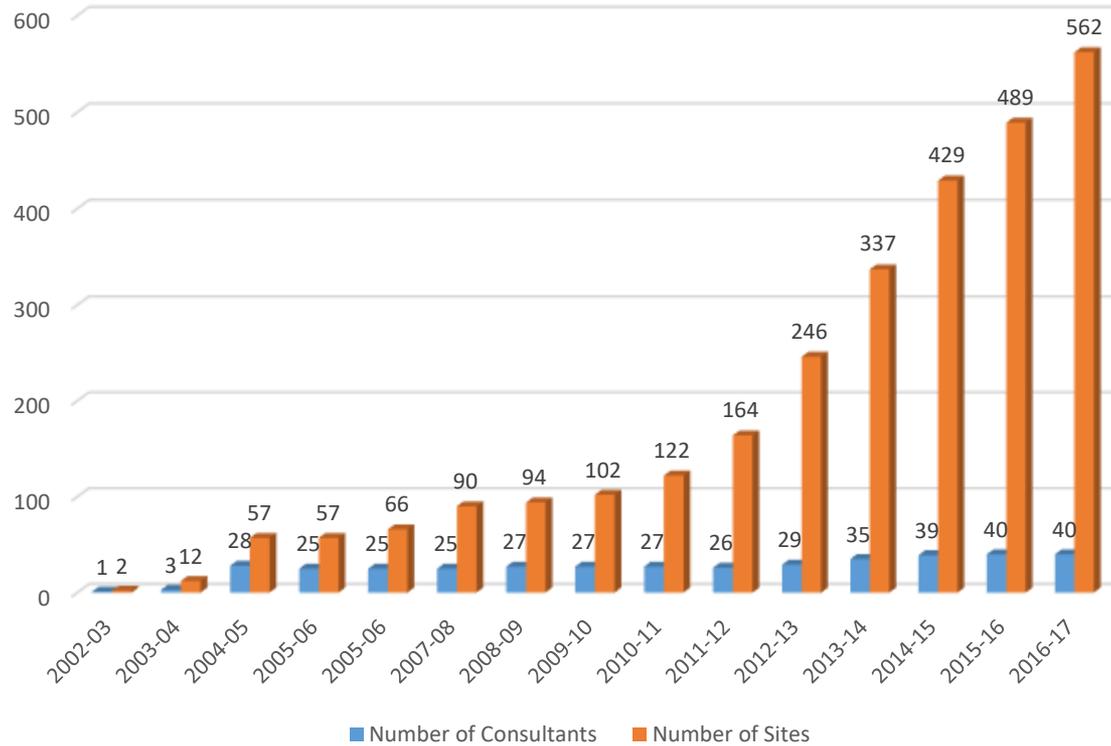
School Year

- Mean of 6.5 students per class
- 10,067 skill tracking sheets (programs)
- 10,512 graphs
- 1678 students
 - Mean of 6 skill tracking sheets per student
 - Mean of 6.3 graphs per student)
- 257 classes reporting
 - Mean of 39 skill tracking sheets per class
 - Mean of 41 graphs per class

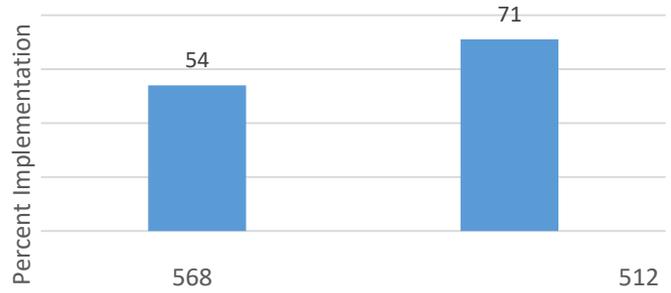
Process

- **Application** (late school year) including designation of internal coach
- **Initial Training: 3 Day Boot Camp** (intensive skill training: competency based)
- **Fall Site review**
- **On site consultation:** Guided practice model/behavioral skill training
 - Collaborators teachers/paras/support staff/internal coaches/administration
 - Manualization: resource file and video training resources
 - Instruction and Problem Behavior Reduction: two sides of same coin
- **Treatment integrity/Consult notes**
- **On site trainings** including review of boot camp
- **2 day trainings** Intermediate and Advanced protocols; Establishing Basic Skill Sets
- **Spring Site Review** and site designation (New, Return, Model, Model Independent)

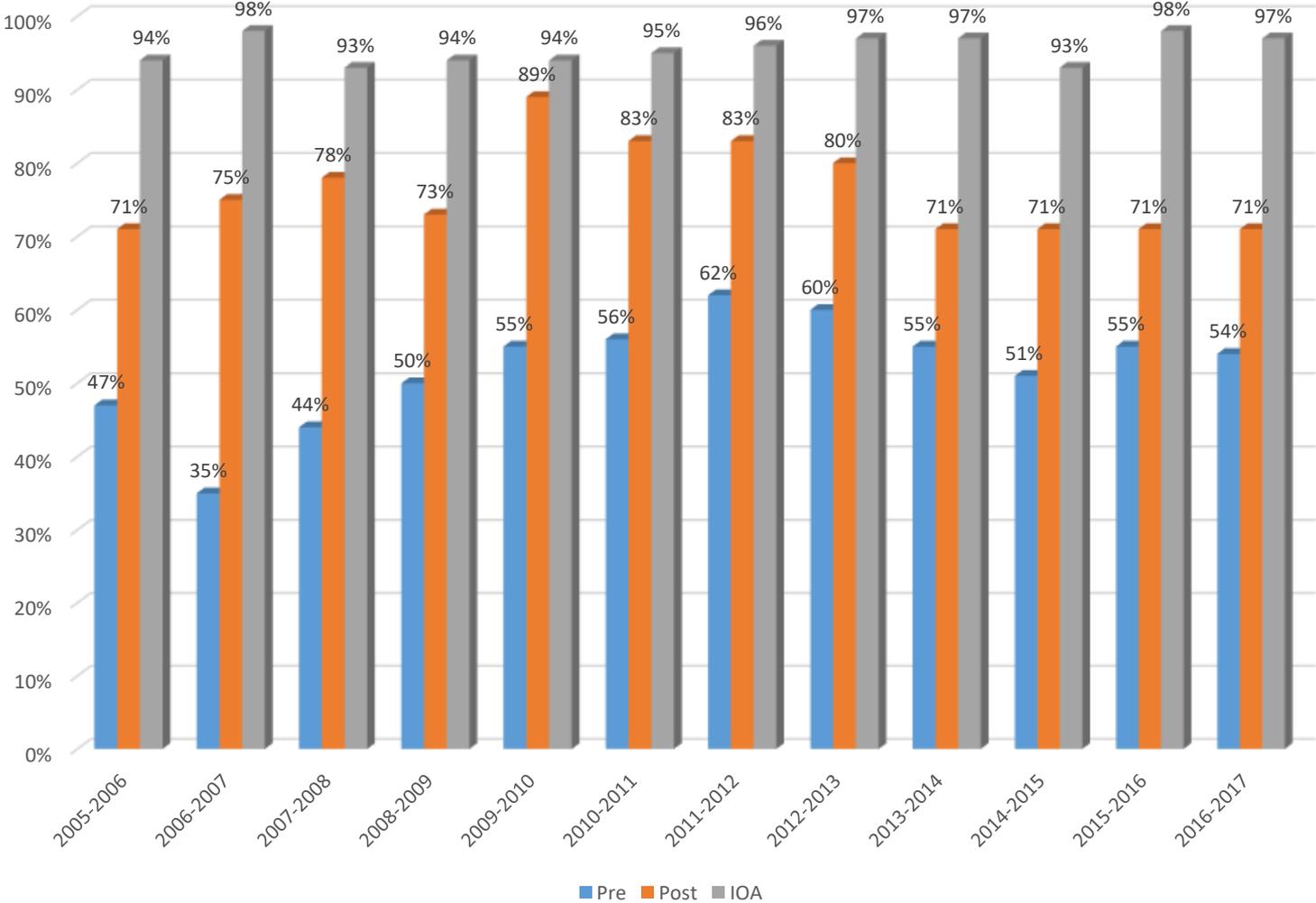
History of Sites Served PATTAN Autism Initiative ABA Supports



Mean Pre to Post Site Review Score
2016-2017



History of Pre to Post Site Review



Instruction and Accommodations

- This session has focused primarily on instruction
- Most accommodations become some aspect of an intervention and must be evaluated for effectiveness: Do they work? Do they build toward independence?

Common Accommodations: Do they work????

- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class
- Use a calculator or table of “math facts
- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair’s legs (so fidgety kids can kick it and quietly get their energy out

Would such accommodations be necessary if...

- Instruction is at the right level? Skills are well sequenced
- Pace of instruction is effective?
- Errors are reduced through errorless teaching?
- Error correction procedures are effective
- Motivation to complete tasks is considered including meaningful reinforcement system
- Sufficient practice is provided
- Skills are taught to fluency
- Skills are taught to a generative level (novel responses)

Remember

- The evidence should guide our selection of what will be taught and how it will be taught
- Currently, selecting interventions that include a behavior analysis is likely a prudent first step
- Selection of interventions is only step one: we also need to teach people to obtain direct evidence of effect (**evidence of practice**)
- To accomplish this, apply a systematic approach to instruction
- Effective collaboration between school and

Informed parents are key to better
outcomes!

Thank you!

Contact Information

www.pattan.net

Mike Miklos

mmiklos@pattan.net



Commonwealth of Pennsylvania

Tom Wolf, Governor

Pennsylvania Department of Education

Pedro A. Rivera, Secretary

Bureau of Special Education

Ann Hinkson-Herrmann, Director