This presentation is on the early indicators of Autism Spectrum Disorder and the importance of early diagnosis for the fourth session of the online course, Survey
After this presentation students will be able to:

• Define evidence-based practice.
• Differentiate between science, pseudoscience, and antiscience.
• Describe the types of evidence necessary to identify an evidence-based practice and the types of evidence to avoid.
• Describe the major outcomes of the ASD-Michigan Project.
Special educators are required by both federal regulation (NCLB, 2002) and professional standards (Council for Exceptional Children, 2009) to use effective interventions and strategies supported by research. In order to be effective, special educators must be knowledgeable about evidence-based instructional strategies that address disability-specific needs in order to provide intensive, explicit instruction within the broader general education curriculum (Brownell, Sindelar, Kiely, & Danielson, 2010).
From your readings, you know that an evidence-based practice is an instructional strategy that has consistently yielded positive results when tested through high quality research (Mesibov & Shea, 2011; Odom, Collet-Klingenberg, Rogers, & Hatton, 2010; Simpson, 2005). Evidence-based practice should not just be “buzz words,” but how many times have you been told, “just use this it’s an evidence-based practice” without being shown the evidence. As educators, we are fed this line by administrators, parents, and even our colleagues.
Science utilizes objective, direct observation, and measurement. It systematically arranges events (causal) and the procedures implemented rule out other plausible explanations. Science also requires replication of the results. In other words in science causal relationship are demonstrated, event A occurs before event B. For example, take the statement the larger your shoe size, the higher your IQ. What do you think about that statement? A plausible or alternative explanation is age. The procedures used in science would rule out age as a plausible explanation.

Pseudoscience treats therapy or interventions that are not supported by scientific method as if they were scientific. It promotes procedures not proven by science and uses jargon to represent science. Pseudoscience represents beliefs, not objective evidence. Approaches may claim that the intervention has been “tested rigorously” but you need to take it at face value and look for listed resources and make sure that the resources listed are peer reviewed. You can just google the journal to find out. Peer reviewed journals require the rigorous components of the scientific method. ‘Tested rigorously’ is a marketing tool. No further details are given about this supposed ‘testing.’ For example, 9 out of 10 doctors agree!

Finally, you have antiscience. Antiscience rejects time-tested scientific methods as a way to produce useful and valid knowledge, advertises interventions as effective, and claims that rigorous testing is not possible when standard methods cannot be used for measurement. Many therapies should be considered pseudoscience or antiscience in
nature. Therefore when looking at treatment options for autism we need to categorize the treatment as science, pseudoscience or antiscience in order to make informed decisions.

(Green, 1998)

Here is an analogy to help you understand the differences between the three.

I know this is an orange because I looked at it, I touched it, I tasted it, and I smelled it (direct measurements).

This is an orange. This fruit was rigorously tested! 9 out of 10 people agree! And my friend told me it was an orange.

This is an orange. There are no standardized tests that can tell me what type of fruit this is, but I’m telling you it’s a delicious orange!
The article you read by Marder and Fraser discussed these types of evidence. We are going to talk about each one in detail.
The first type of evidence is demonstration. Is there research demonstrating the use of the intervention? versus I know someone who had good results with this intervention. You need to look at the research that has been done. You need more information than the speculation of others.

For example, if someone says, this intervention works for students like yours. You need to ask, “What is the research to support the use of this treatment for my students?”
The second type of evidence is objective. Examples of objective evidence are standardized tests, direct observational methods. In contrast, subjective evidence includes anecdotes, testimonials, case studies, self-report, biographies, and opinions.

Direct observational measures should include: operational definitions, clearly outlined measurement and implementation procedures, data collectors blind to hypotheses, and multiple measures.

Let’s look at operational definitions. Take foot stomping for example - the definition has to be clear enough so that anyone reading it knows exactly which behaviors count. We would all probably agree that this is foot stomping. But what about that student who goes to do it and then just looks at you – does that count? How loud or forceful does it have to be? What about if the student is sitting down and does it with the back of his heel? A good operational definition will be explicit about what will be counted and will even include what doesn’t constitute the behavior.

Data collectors blind to hypothesis means the individuals who implement or collect data are unaware of the researcher’s hypotheses.

Multiple measures of treatment effects can included behavioral observations, rating scales, and/or standardized tests.
People see what they want to see including parents, professionals, and researchers – its human nature. So we need to have these things in place so our bias doesn’t cloud the results.

Effective research studies that are conducted include procedures to minimize the influence of natural human bias on the evidence obtained in research and the conclusions that are drawn.

There should be enough information in the study for you to replicate all aspects – measurement tools, procedures, environment, materials.

Therefore, procedures are used that ensure evidence is obtained objectively. We want to avoid research studies that focus on subjective evidence. While subjective evidence is good to know and can be very interesting, it does not draw on objective evidence and is a form of indirect measurement.
The third type of evidence is direct measurement. Effectiveness determined by direct measures ties back to objective measurement and includes student outcomes, real time observation of behavior, and is NOT questionnaires examining opinions, or other indirect measures.

For example: Therapy x is effective at increasing language skills. A direct measure would be the number of words the child can say before and after the intervention. An indirect measure would be the parent’s opinion of the child’s language improvement after therapy.

When examining research studies we want to look at studies that report student outcomes, real time observation of behaviors. For example, WHICH social skills has the treatment improved? With the intervention in place has the student learned to respond appropriately to a peer’s greeting? Has that outcome been directly measured?

You can also have indirect measures but you need the direct measurement. If there is no direct measurement then we are determining effectiveness on subjective evidence alone.

Indirect measures can provide useful information in conjunction with direct measures. Opinions are often collected for social validity purposes in addition to direct measures. For example, Does a parent feel their child is more compliant at home? Does the
teacher feel their student can better understand social cues? Was the intervention easy to implement?
Another example is Dr. Temple Grandin, she is an excellent resource and provides us with a unique perspective on autism, but this is not the only evidence we need.
The fourth type of evidence is comparative. Results that compare: two different interventions, an intervention group and a control group, or the difference when the intervention is in place and when it is removed.

Noncomparative studies claim to show an effect when the treatment was implemented without showing a comparison.
The fifth type of evidence is experimental research. Observation and description alone do not provide conclusive results regarding appropriate therapy. It can provide the opportunity to develop hypotheses. Experimental research systematically tests these hypotheses using independent and dependent variables, demonstration, objective evidence, and comparisons. Think back to science class when you had to measure if a plant would grow better in the closet or better sitting on the window sill. Experimental research attempts to prove that a specific change in one event (or the dependent variable - plant growth) can be produced by manipulations of another event (independent variable – the closet or window sill). The dependent variable is dependent on the other variables, or the other things you’ve put in place to cause change. The dependent variable is the variable in which you want to see change. The independent variable is the intervention used to cause change.
You want to avoid treatments that claim every individual with ASD will benefit. These treatments are not based on the child’s individual needs. You also want to avoid those that claim miraculous improvement or a cure, “One day a treatment resulted in instantaneous change in my child!” These claims sound great and can be persuading, especially to families with newly diagnosed children who want to do something immediately. We need to be aware of this and provide families with appropriate information on the research of these types of treatment. Therefore, it’s not just enough to know which interventions are evidence-based, we also need to know about the ones that aren’t so that we can articulate to parents and other professionals why the treatment they saw on Entertainment Tonight may not be the best option for their child. We also talked about subjective evidence and how you should avoid those treatments only supported by subjective evidence such as anecdotal evidence, testimonials and case histories or studies. These types of evidence alone are not enough to prove effectiveness as they are subject to bias often due to money or time constraints (they may be trying to sell you a product) and uncontrollable extraneous factors such as medication was started when the intervention took place. There needs to be other things in place in order to rule out all other possibilities.
You also want to avoid those reported only in media news outlets, popular magazines, and website advertisements as typically only the positive outcomes are reported in these media forms (Schreibman, 2005). Interventions should be pursued only when supported by research in peer reviewed professional journals. Make sure you are using the questions to critically evaluate treatment approaches as stated in the article by Marder and Fraser.
Unfortunately, not only are many teachers unaware of evidence-based practices, they have not mastered the few they are familiar with to the level that is required to impact student learning (Scheuermann, Webber, Boutot, & Goodwin, 2003).
In 2011, a study was conducted to provide a snapshot of public school services provided to kindergarten through twelfth grade students with Autism Spectrum Disorder across the state of Michigan. School professionals were asked to report their use of 65 educational interventions. The five most commonly reported being used were: visual supports, structured teaching, direct instruction, applied behavior analysis, and social stories. Four out of these five interventions (all except direct instruction) have substantial research-based evidence supporting their use for students with ASD. However, although many school professionals reported using these four interventions that are supported by research, they most commonly reported using the given interventions for only part of the day, and many did not report using them at all (31% to 44% of school professionals reported not using them for the student on whom they reported). Follow-up observations suggest that school professionals may not incorporate core aspects of these interventions in the programming provided to students.

In addition, the most common way in which special educators reported being trained on interventions that had substantial research support was through graduate study. Therefore, unless teachers are pursuing their master’s degree or other graduate level study, they are not being trained to use evidence-based practices! Further, paraprofessionals reported having little or no formal training in the interventions with the greatest research support, even though nearly one-third of the students were reported to have a 1:1 paraprofessional/teacher assistant work with them during the school day.
(Bolt & Ferreri, 2011)
It is imperative that we as educators are aware of disability-specific evidence-based practices and consistently implement them with our students. It is also necessary that we can evaluate the evidence ourselves, so that we can stay up-to-date on the most recent research and assist parents and other professionals to understand the evidence, or lack thereof, behind specific interventions.
Here are the references used in this presentation.


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