



Science in Autism Treatment

Newsletter of the Association for Science in Autism Treatment

Volume 14, Issue 2 | Spring 2017

LETTER FROM ASAT'S PRESIDENT

If you're anything like me, you probably struggle to make enough time for yourself. With most hours of the day devoted to your profession, family, and commuting, these competing contingencies limit what we can devote to ourselves. Yet you hear a voice in the back of your head urging you to give. With thousands of good autism-related causes, why the Association for Science and Autism Treatment (ASAT)?

The answer is simple – because of your desire to keep science at the forefront of your conversation about autism treatment. Making smart decisions means staying engaged (e.g., liking us on Facebook, following us on Twitter) and educated (e.g., joining our newsletter subscriber drive, sharing our newsletter with family and friends, helping us reach others by displaying ASAT materials). Your willingness to convey information builds our audience and increases our reach, which will ultimately lead to a boost in our social media presence across Twitter, Facebook, and YouTube.

Start with what concerns you personally. Make a link with your own life, even if it seems trivial compared to the world's problems. If you know someone with autism, you can certainly help us refine our message and target audience by telling others about ASAT, sharing specific pages from our website, and helping us reach the medical practitioners in your area. If you feel a nagging guilt about the people you've lost touch with over the years, then get back in touch by sharing our newsletter and how it relates to your world. Draw connections between ASAT and what's current — share our evaluation of new fad therapies, inaccurate media portrayals of autism, and the misrepresentation of effective science-based treatments.

Charity is no longer about "giving to the needy," but rather about creating real change. So, become a sponsor, hold a fundraising event at your workplace, volunteer, advertise with us, donate items to our online auction, host a paper icon drive, or shop at Amazon (to contribute .5% of eligible purchases to ASAT)! While we appreciate monetary donations, there are so many ways to contribute to ASAT's growth (at least 19), that it's possible without having to give money directly.

Your support and influence over how science-based treatments are presented is your contribution to the field of autism. Remember, what you give isn't measured by the size of your donation, but by how wisely you've supported ASAT.

Yours in Science,

Leanne Tull M.ADS, BCBA

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19 WAYS TO SUPPORT ASAT

Catherine Rooney, BCaBA
ASAT Extern

The Association for Science in Autism Treatment is nineteen years old this year! We are celebrating our anniversary by launching a campaign designed to increase the visibility of our organization and to increase support for our mission and initiatives. We are asking for your involvement in 19 different ways.



#1 Like us on Facebook: Like ASAT on [Facebook](#) and encourage others to do the same so we can surpass our 12,500-fan goal for 2017. We are very close! You can see updates from ASAT, read our Media Watch letters, website announcements, and information about upcoming newsletters and events. We welcome your active participation and encourage you to post comments and share content with your colleagues and friends on Facebook. This only takes a moment and creates valuable exposure for science-based autism treatments worldwide.

#2 Follow us on Twitter: Follow ASAT on [Twitter](#) and retweet our posts. We have over 1,400 followers. We regularly send out tweets notifying all followers about any news from ASAT including notification about our latest newsletter, *Science in Autism Treatment*, information about ASAT events, and weekly tweets directing followers to articles and other items of interest. Please [follow ASAT](#) on Twitter and join us in our efforts to acquire new followers by tweeting about ASAT to your friends and encouraging all your social contacts to follow us on Twitter.



#3 Share our newsletter with friends and family: Email ASAT's newsletter link to friends and colleagues and encourage them to [sign up](#) for our free, informative quarterly [newsletter](#). If you do, our 2017 goal of 12,000 subscribers will be quickly realized! Since the summer of 2009, we have published 27 issues of our newsletter, *Science in Autism Treatment*, which now has over 11,000 subscribers in all 50 states and 100 countries worldwide. Archived issues of our newsletter can be found [here](#).

#4 Volunteer with us: Do you have a special talent, skill set, or some time to offer our organization? ASAT's success rests on the volunteer service of family members, professionals, and community members. Consider volunteering or participating in our externship program. If you are interested, please visit our [volunteer](#) page or [externship](#) page.



“Working with ASAT has been a great experience. I’ve had the opportunity to use my strengths and build upon them by writing in the newsletter, learning about the grant application process, and collaborating with other team members. Most of all, my experience has enhanced my skepticism and ability to look for the facts related to autism treatment.” ~ Alice Walkup (Los Angeles, California)

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#5 Display an ASAT Donation Jar: Do you have or know a business that can display an ASAT Donation Jar? Showcase an ASAT donation jar at various business establishments to help educate consumers and to raise money to support our mission. You can even place a donation jar in your own workplace! ASAT will provide the materials needed (donation jars, an ASAT information card for the jar, business cards, and signage) for any participating business. You can read newsletter articles about participating businesses on our [fundraising page](#). Your business could get publicized in the ASAT newsletter too!

#6 Donate and receive a tax deduction: Do you or someone you know need an end of the year tax deduction? Please encourage friends, family members, and colleagues to [donate](#) to the Association for Science in Autism Treatment. Donations in any amount are deeply appreciated. These funds will support a wide array of initiatives including the development and distribution of materials to educate medical professionals about evidence-based treatment for children and adults with autism. Donations can easily be made online through [PayPal](#) or by mail.



#7 Seek out a match for your charitable donations: Does your employer match charitable donations? Please consider approaching your employer to find out if your company can match your donation to ASAT. Some employers even make contributions that are twice as much as your individual donation! ASAT would be happy to provide information to your employer or complete applications for matching contributions. Please send requests to donate@asatonline.org.

#8 Join our subscriber drive: Help put our newsletter in the hands of more people. Help us garner new newsletter subscribers by bringing this [handy sign-up sheet](#) to your workplace, partner agencies, or meetings. You can scan completed sheets and send via [email](#) or mail to:

ASAT Subscriber Drive
PO Box 1447
Hoboken, NJ 07030.



#9 Become a sponsor: Show your support for ASAT and enjoy the benefits of being a sponsor, including recognition and newsletter advertisements! We have two types of sponsorship options, each with several levels that provide various incentives to sponsor ASAT: [professional sponsors](#) or [community sponsors](#). Please encourage your supervisor or service provider to consider sponsorship.

#10 Help us reach others by displaying ASAT materials: Display our posters, fliers, or other promotional materials in your workplace or other venues, such as coffee shops and bookstores. Doing so will spread the word about ASAT and the importance of science in the treatment of autism. Think about how many passersby may benefit from seeing ASAT's message. If you are interested in distributing our materials, please send us an [email](#).



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#11 Help us to reach the medical practitioners in your area: Be a proud supporter of our mission by distributing ASAT's information fliers to medical providers and educators in your community. Take some to your next doctor's appointment and be sure to share with your own medical team. If you are interested in sharing material specifically designed for physicians, please send us an [email](#).

#12 Tell others about ASAT: You can help spread ASAT's message of the importance of science in the treatment of autism. At your next professional event or training, include a slide about ASAT at the end of your presentation or distribute sign-up sheets for our free quarterly newsletter. If you are involved in teaching at the graduate or undergraduate level and want to learn more about how ASAT can support your course offerings, please send us an [email](#).



#13 Shop at Amazon: ASAT is connected with AmazonSmile. AmazonSmile is the same Amazon you know, same products, same prices, same service. Please support our mission to promote evidence-based, scientifically sound treatments for individuals with autism by choosing us one time and then supporting us every time you make a purchase through Amazon. The link [here](#) will allow you to make purchases through Amazon

as usual while donating .5% of eligible purchases to ASAT. We greatly appreciate your participation! Remember: You shop, Amazon gives!

#14 Hold a fundraising event at your workplace: You can build team morale and camaraderie by working together for a great cause (such as the importance of science in autism treatment!). By holding a fundraising event to support ASAT at your workplace you can demonstrate that commitment. It is easy to customize your fundraising event to reflect your workplace values and day to day activities. For instance, you can organize a bake sale. Some of our supporters have held Dress Down Friday and charge a donation fee to participate. If you would like more ideas or need help planning your event contact us by email today at donate@asatonline.org.



#15 Bid, and bid often: Early next year, ASAT will launch an online auction through Bidding for Good. We always have great items up for bid: autism-related products, signed books, sports and entertainment memorabilia, hotel stays, amusement park tickets, recreational and sports tickets, and so much more! Proceeds from this auction directly support several important projects, including wider spread distribution of our free quarterly newsletter, promotion of public awareness of science in autism

intervention through our website, and expanding our outreach to the medical community.

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#16 Donate to our auction: If you would like to donate an item (e.g., product) for our next campaign, please contact us at: auction@asatonline.org.

#17 Host a Paper Icon Drive: Paper icon initiatives have been successful in banks, retail stores, coffee shops, etc. and typically involve customers making a small donation and then placing their name on a paper icon which may be displayed on a wall. ASAT can provide donation paper icons for your business to sell at the register(s) for a designated time frame chosen by the business. Icons can be sold for \$1 or the customer can donate at a level of his/her choice. April is Autism Awareness month, but a paper icon campaign can be implemented any time throughout the year.



#18 Advertise With Us: ASAT accepts advertising for the ASATonline.org web site, newsletter and other ASAT publications to offset its operational expenses. Advertising may represent a way for your business to support ASAT while having the opportunity to also promote your organization. To learn more, please [click here](#).

Please be advised that products or services accepted for advertisement by ASAT must be consistent with our mission to disseminate accurate, scientifically-sound information about autism and its treatment and to improve access to effective, science-based treatments for all people with autism. All advertisers are asked to complete the [ASAT Advertising Form](#).



#19 Share specific pages from our website: Did you know you can share specific pages of our website? Whether it is a parent, a medical, treatment, or educational professional, or a member of the media who needs to be savvy when reporting on an autism-related story, our website is full of valuable information. At the bottom of every page we make it easy to disseminate knowledge through a variety of social media platforms. We make it easy to share with everyone in your community, as well as locally, nationally, or internationally. Through sharing science-based treatment information with others you may change the life of a child with autism in significant and meaningful ways. Science matters!!!

INVITED ARTICLE

Treatment Integrity: Why it is Important Regardless of Discipline

Denys Brand, PhD
University of Kansas

In 1988, Van Houten and colleagues published an article in the *Journal of Applied Behavior Analysis* outlining six fundamental rights of individuals receiving services based on the principles of behavior analysis. One of these included the right to receive the most effective procedures available. There are several methods to ensure that this fundamental right is honored. One method is to implement procedures for which there exist a robust body of empirical literature documenting the efficacy and effectiveness of that procedure (Behavior Analyst Certification Board, 2014). Another is to ensure high levels of treatment integrity while implementing those effective procedures. Treatment integrity (also known as procedural integrity, procedural fidelity, and treatment fidelity) is the extent to which interventionists implement procedures in a manner consistent with their prescribed protocols (e.g., DiGennaro Reed & Coddling, 2014, Peterson, Homer, & Wonderlich, 1982). This article discusses treatment integrity and the importance thereof, not just in the field of behavior analysis but across disciplines.

In preparation for this article, a PsycINFO® search was conducted to identify the number of peer-reviewed articles, regardless of discipline, with the terms treatment integrity, treatment fidelity, procedural integrity, and procedural fidelity in the title of the article. The search identified 225 articles, which included experimental work, literature reviews, and commentaries. A closer look at the articles that the search identified indicates that treatment integrity is a topic of empirical interest across numerous disciplines, including intellectual and developmental disabilities, dementia care, special education, mental health, addiction and substance abuse, social work, psychotherapy, and cognitive therapy, just to name a few. The search also indicated that since the year 2000, there has been a sharp increase in the number of articles published on treatment integrity. Of the 225 articles identified, 205 (91%) have been published since the year 2000. It is important to provide a

rationale for why studying treatment integrity is important, regardless of discipline, since it is a topic to which much recent empirical research has been dedicated.

Implications for Research

An overview of the published literature on treatment integrity reveals that it is an important methodological concern, regardless of discipline, for two main reasons: research and practice (Hagermoser Sanetti & Kratochwill, 2009). From a research perspective, high levels of treatment integrity are essential in reaching accurate conclusions regarding functional relations between dependent (i.e., outcomes) and independent variables (i.e., procedures). That is, high levels of treatment integrity increase the internal validity of a study and minimize the possibility that variables not related to the study are effecting outcomes (Cook & Campbell, 1979). Internal validity is an important indicator regarding the quality and rigor of a study (Bruhn, Hirsch, & Lloyd, 2015). Compromised treatment integrity can lead to erroneous conclusions regarding treatment effectiveness. For example, compromised levels of treatment integrity can produce outcomes suggesting that effective procedures are ineffective and vice versa (Gresham, Gansle, & Noel, 1993).

Either one of these conclusions can have detrimental effects on the development of effective procedures. For example, if a procedure is implemented with the aim of increasing prosocial behavior in a child with autism, and no increases in behavior is shown, it may lead the interventionist to conclude that the procedure was ineffective and that more intensive training is required. However, without measuring the integrity with which the procedure was administered, it remains unclear whether the procedure itself was ineffective, or whether the procedure would have been effective had prescribed protocols been

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followed. If the interventionist concludes that the procedure was ineffective, it becomes less likely that the procedure will be used with other clients in the future. Low levels of treatment integrity also adversely affect external validity (i.e., the degree to which the results from a study can be generalized across people, settings, and behaviors) and the ability of other researchers to replicate the procedures and find similar results, which can also have a detrimental effect on the development of effective procedures (Baer, Wolf, & Risley, 1968).

Unfortunately, reporting quantifiable measures of treatment integrity within published literature is not the norm. Several literature reviews have been conducted across various disciplines to assess the frequency with which treatment integrity data are reported. The results from these reviews paint a somewhat grim picture and should motivate researchers and journals to pay more attention to the reporting of treatment integrity data. Monchar and Prinz (1991) conducted a review involving journals across four disciplines (psychiatry, clinical psychology, behavior therapy, and marital and family therapy) for articles published between 1980 and 1988. Of the 359 articles reviewed, only 67 (19%) reported treatment integrity data, although the review showed that articles published towards the end of the review period were more likely to report treatment integrity. Wheeler, Baggett, Fox, and Blevins (2006) reviewed articles across a range of behavior analytic journals involving treatments for people with intellectual and Development Disabilities (I/DD). Out of the 60 articles included in the review, 41 (67%) did not provide any treatment integrity data. Other reviews involving psychotherapy (Perepletchikova, Treat, & Kazdin, 2007), correctional treatment programs (Andrews & Dowden, 2005), and aphasia treatments (Hinckley & Douglas, 2013) have found similar results. For example, the Hinckley and Douglas (2013) review found that of the 149 aphasia treatment studies included in the review, only 21 (14%) reported treatment integrity. Despite these numbers, it is encouraging to see that various disciplines have begun the process of self-evaluation with respect to reporting treatment integrity data. For some related fields, such as gerontology, occupational therapy, and performance management, literature reviews outlining the frequency with which treatment integrity data are

reported, to the best of our knowledge, do not exist (Bruhn et al., 2015). Treatment integrity literature reviews usually contain recommendations calling for journals and authors to measure and report treatment integrity data as often as possible and with increased frequency. I wish to add my voice to these recommendations.

Implications for Clinical Practice

Treatment integrity is also important from a clinical practice perspective. Research investigating the relationship between treatment integrity and client outcomes are either correlational (e.g., Downs, Downs, & Rau, 2008), or experimental (e.g., St. Peter Pipkin, Vollmer, & Sloman, 2010). Correlational studies involve recording data on how changes in client behavior coincide with changes in treatment integrity. Experimental studies involve arranging conditions in which treatment integrity is systematically manipulated and assessing how client outcomes are affected under these varying treatment integrity conditions. Experimental studies allow for functional conclusions with respect to how varying levels of treatment integrity affect client behavior, whereas correlational studies do not.

Durlak and Dupre (2008) published a review article in the *American Journal of Community Psychology* investigating the relationship between treatment integrity and client/program outcomes. The review included more than 500 articles covering areas such as mental health, alcohol and substance abuse, social skills, and physical health promotion. The review found that procedures implemented with high levels of integrity are more effective compared to procedures that are implemented with lower levels of integrity. For interested readers, similar reviews involving drug prevention studies (Tobler, 1986), anti-bullying programs (Smith, Schneider, Smith, & Ananiadou, 2004), and mentoring (DuBois, Holloway, Valentine, & Cooper, 2002) have also been conducted.

Research investigating the relationship between treatment integrity and client outcomes have also involved people with I/DD. I/DD is characterized by deficits in adaptive (e.g., social and interpersonal skills), and intellectual functioning (e.g., reason, judgement) and is often diagnosed before age 18 (American Psychiatric Association, 2013). Unfortunately, the I/DD literature does not contain a

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review article similar to that of Durlak and Dupre (2008) that synthesizes the results from experimental studies in which levels of treatment integrity were systematically manipulated to assess the effects on client behavior. The I/DD literature would greatly benefit from such a review. The following paragraph contains a brief summary of some of the conclusions reached by authors in the field of I/DD when conducting experimental treatment integrity research.

A consistent finding in the I/DD literature is that higher levels of treatment integrity are associated with best client outcomes (e.g., DiGennaro Reed, Reed, Baez, & Maguire, 2011). Specifically, client outcomes are best when procedures are implemented with perfect treatment integrity. Although implementing procedures with perfect integrity every time a procedure is carried out in the natural environment may not be feasible, interventionists should strive to implement procedures with high levels of integrity as often as possible. An interesting finding is that when treatment integrity decreases, client behavior becomes less predictable (e.g., Groskreutz, Groskreutz, & Higbee, 2011). That is, for some clients, decreasing levels of treatment integrity do not adversely affect their behavior as much as others. Another finding is that skill acquisition is possible when treatment integrity is compromised (e.g., Jenkins, Hirst, & DiGennaro Reed, 2015). However, skill acquisition despite compromised levels of treatment integrity applies only to a minority of clients, and skill mastery is often delayed when treatment integrity is low. Next, initial exposure to procedures consisting of treatment integrity errors appear to have idiosyncratic long-term effects on client behavior (e.g., Leon, Wilder, Majdalany, Myers, & Saini, 2014). Research of this kind involves exposing participants to initial low-integrity conditions before getting exposure to high-integrity conditions. For some clients, skill acquisition is delayed but not for others. The exact source of this variability across clients has not yet been determined. Finally, research conducted by St. Peter Pipkin et al. (2010) found that treatment integrity errors are less detrimental with respect to client behavior if procedures are initially implemented with perfect integrity.

Enhancing Treatment Integrity

The treatment integrity literature contains several examples of empirically validated evidence-based methods of training interventionists to administer procedures with high levels of integrity. I will briefly describe three training procedures used to enhance treatment integrity: behavioral skills training (Miltenberger, 2004), performance feedback (e.g., Leblanc, Ricciardi, & Luiselli, 2005), and video modeling (e.g., Catania, Almeida, Liu-Constant, & DiGennaro Reed, 2009; Weldy, Rapp, & Capocasa, 2014). These training procedures typically result in skills maintenance (i.e., high levels of treatment integrity are maintained for extended periods following the completion of the training), and can be relatively time and cost effective to implement.

Behavioral skills training (BST) consists of providing trainees with detailed instructions on how to correctly perform target skills, modeling or demonstrating to trainees how to correctly administer target skills, providing trainees the opportunity to practice target skills, and providing feedback regarding their performance once they practiced performing target skills. For example, Sarokoff and Sturmey (2004) used BST to train special education teachers to implement discrete-trial training (DTT) procedures with high levels of integrity. Initially, all teachers implemented more than half of all DTT procedures incorrectly. Following the implementation of BST, all teachers implemented DTT with close to perfect integrity. Other research examples of when BST was used to enhance treatment integrity includes Rosales, Stone, and Rehfeldt (2009), and Miles and Wilder (2009).

Performance feedback consists of providing trainees with direct feedback about the integrity with which procedures are implemented. Performance feedback can also consist of goal setting and graphing trainee progress with respect to progress on their goals (Hagermoser Sanetti & Kratochwill, 2008). In the Leblanc, Ricciardi, and Luiselli (2005) study, performance feedback consisted of providing interventionists with positive feedback for skills performed correctly, corrective feedback for skills performed incorrectly, and answering any interventionist questions regarding the procedure. Results showed that treatment integrity increased following training and that performance gains were

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maintained up to 11 weeks following training. For further discussion on performance feedback, readers are referred to an excellent article by Hagermoser et al. (2008).

Video modeling involves trainees watching a video that demonstrates how to administer procedures correctly within a given context (Catania, Almeida, Liu-Constant, & DiGennaro Reed, 2009). Research suggests that video modeling is most effective when a wide variety of potential interventionist behaviors are used as exemplars within the video (e.g., Moore & Fisher, 2009). Other research has shown video modeling to be even more effective when combined with performance feedback (e.g., DiGennaro Reed, Coddington, Catania, & Maguire, 2010). Some examples from the literature of when video modeling was used to increase treatment integrity includes Catania et al. (2009; training interventionists to implement DTT procedures), and Neef, Trachtenberg, Loeb, & Sterner (1991; training respite-care workers).

In conclusion, I am greatly encouraged by the increased number of published research articles in recent years with respect to treatment integrity. Treatment integrity is an interesting and exciting area of research. This article discussed reasons why treatment integrity is important, regardless of discipline, from both research and clinical perspectives. I hope this article encourages researchers and interventionists to measure and report treatment integrity data with greater frequency given the reasons outlined here.

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PERSPECTIVES

The Myths I Believed About Behavior Analysis

Janine Shapiro, CCC-SLP, BCBA
Access Behavior Analysis

Janine Shapiro outlines in this article her journey as an SLP who initially was a firm vocal critic of ABA to a true advocate of the discipline. Follow her reasoning as to why she now marries SLP and ABA in her daily practice for optimal client results.

Franca Pastro, BA
Perspectives Coordinator

As the first dually certified speech-language pathologist (SLP) and behavior analyst in Indiana, I fully believe in the power of fusing speech, language, social, and applied behavior analysis (ABA) sciences together to deliver more effective treatment. But I have not always been a proponent of ABA. Early on in my career, I even authored a scientific article countering some of the science behind ABA. However, a lot has changed since then.

Learning as a Student

As a graduate student of speech-language pathology, I heard many common misconceptions about ABA. For example, I was told ABA was outdated, unnatural, and created “rote” or robotic behavior in children. I believed what I heard. In fact, I conducted a scientific study with a fellow student under the direction of a doctorate-level clinical supervisor to examine the effectiveness of five social therapy techniques. Published in the respected *Journal of Autism and Developmental Disorders* in 2008, the article focused heavily on how the specific social therapy philosophy we studied differed from an ABA approach to teaching social skills — and, more importantly, how those differences made the targeted social therapy more effective than the ABA techniques. At the time, I truly believed in the value of the research we performed and the explanation of the promising results we published. Now, however, I realize that many of the components we used in the research study were behavior analytic. I dismissed the value of the science while inadvertently using it. Moreover, without the behavior analytic components of the treatment we studied, the intervention would not have been successful. Had I known then what I know now, I would have applied the principles of behavior analysis in a more targeted, judicious manner, and we would have likely had even more impressive outcomes to publish!

Meeting a BCBA

I started working at a private practice about a year later. The owner announced one day that she’d hired a speech-language pathologist who was also a Board Certified Behavior Analyst (BCBA). I’d never even heard of the term BCBA, but was appalled the moment I learned it was related to ABA. I immediately went to Google for a refresher on all the negative statements I’d heard about ABA. As with any Google search, you can always find what you’re looking for and I focused on those that confirmed my worst fears. But then I met Angie, the new SLP/BCBA, and through her work, she exposed me to the reality of ABA therapy for the first time. By just observing her at work, I realized she had an enormously effective skill set that I did not



Janine Shapiro, CCC-SLP, BCBA

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“I see ABA as a science, grounded in an extensive evidence base, that every practitioner who dreams of teaching anything to anyone should learn.”

possess. The truth was undeniable but what I discovered was that, similar to my own experience, most practitioners don't understand what ABA is, what it addresses, or what occurs during an ABA session.

Applying Both Sciences to My Practice

My mind started flipping through a Rolodex of past clients who could have benefited from interventions and therapeutic strategies that utilized ABA. I began a whole-hearted pursuit towards certification as a BCBA—only turning back to convince other speech-language pathologists of the value I'd found in the science I had once publicly maligned.

Over the years, I've witnessed how combining speech and ABA therapies into a single treatment is much more effective than segregating the two. Today, I cannot imagine being an effective speech-language pathologist without my knowledge of, and training in, ABA — it plays an integral part in my daily therapy practices. At the same time, I lean heavily on the developed and respected sciences of speech and language. People have asked me if I switch hats during the day from speech-language pathologist to behavior analyst. The answer is, I don't because I can't tell you where one science ends and the other begins. It's like asking a person, “Which sense are you using right now?”

I see ABA as a science, grounded in an extensive evidence base, that every practitioner who dreams of teaching anything to anyone should learn. It doesn't typically advise what I teach or even the skill components that lead to the final outcome; these are informed by the speech and language research. But it does tell me how to make every aspect of the teaching process more efficient and effective. During daily practice, all of my training is so intertwined that one aspect cannot exist without the other.

Families are often surprised by the quick progress they observe when watching a therapy session that combines these two bodies of knowledge. I can relate to this feeling of awe because I imagine it is similar to what I experienced observing Angie a decade ago. That's why I'm passionate about developing new procedures within our clinical work, where we continually blend these two bodies of knowledge to help our clients make greater gains than their families ever thought possible.

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MEDIA WATCH FEATURED LETTER

Response to NBC News's "Brain Scans Detect Signs of Autism in High-Risk Babies Before Age 1"

Victor Chin, BA
Renee Wozniak, PhD

In this issue of SIAT, we feature a Media Watch letter written in response to NBC News', "Brain Scans Detect Signs of Autism in High-Risk Babies Before Age 1." In this letter, Victor Chin and I commend the article's authors for their responsible journalism and expand on their discussion of the value of early diagnosis by communicating the importance of choosing the right treatment upon receiving that diagnosis. You can see all of our archived [Media Watch Letters](#) on our website and the condensed "Media Alerts" on [Facebook](#), to stay up to date on the latest responses to portrayals of autism and autism treatment in the media.

Renee Wozniak, PhD, BCBA-D
Media Watch Lead

Dear Ms. Dunn and Ms. Weaver:

We are writing in response to your recent [article](#) titled, "Brain Scans Detect Signs of Autism in High-Risk Babies Before Age 1." We would like to commend you for reporting this research and discussing its impact on autism treatment. Additionally, as a science-based organization, we appreciate your commitment to responsible journalism as you conveyed possible limitations of the research, as well as the fact that additional research is needed. A forthright article such as this goes a long way toward helping readers understand the impact of research as it relates to their own circumstances.

While additional research specific to this study may still be warranted, a number of scientific studies have already demonstrated the effectiveness of early intervention on reducing the impact of symptoms that may be associated with autism spectrum disorder (ASD). As you pointed out, lowering the age of detection and diagnosis of autism can lead to earlier behavioral treatment and intervention, improving the outcomes of children with ASD. We would like to take this opportunity to expand on your article by discussing options for parents who face the challenge of selecting appropriate treatment for their child. While earlier diagnosis may open the door to earlier treatment, not all "treatments" are created equal. If the right treatment is not selected, early diagnosis may be for naught. Parents of children who receive an autism diagnosis have an overwhelming number of interventions from which to choose. Unfortunately, many of these purported interventions do not have adequate research to support their effectiveness. Parents should seek treatments that are backed by data emerging from sound, scientific experimental designs. More information on [evaluating research](#), [weighing the evidence](#) behind autism treatments, and the evidence behind currently [proposed treatments](#) can be found on our website.

One approach to treating autism that is backed by several hundred sound experimental designs is applied behavior analysis (ABA). ABA has the largest evidence base for treatment of ASD, and is endorsed by the United States Surgeon General as a safe and effective treatment for autism. ABA is an evidence-based, data-driven approach that utilizes extensively researched behavioral principles to teach individuals with autism a variety of socially significant skills as well as treat challenging behaviors. Programming is highly individual-

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ized based on a person's specialized needs. Employing the principles of ABA, Early Intensive Behavioral Intervention (EIBI) may be specifically implemented for very young children with autism, even before the age of two. The effectiveness of EIBI has been demonstrated through repeated scientific investigation and has produced numerous favorable outcomes including gains in social, communication, academic and adaptive skills. EIBI enjoys considerable scientific support, with additional research warranted to further generalize findings.

At the Association for Science in Autism Treatment (ASAT), some of our chief goals include educating parents about the importance of selecting appropriate treatments, as well as effectively navigating the complex world of autism research. We want to thank you for discussing the value of early diagnosis in ASD treatment outcomes. As autism is a spectrum disorder, with affected individuals experiencing vastly diverse challenges, a “one-size-fits-all” approach to autism treatment is not recommended. However, any treatment worthy of implementation should unquestionably be backed by scientific research. We encourage parents to seek more information about available treatments and services and advocate for their child to make sure he or she is receiving individualized, scientific evidence-based interventions as early as possible.

Sincerely,

Victor Chin, BA

Renee Wozniak, PhD, BCBA-D

Association for Science in Autism Treatment

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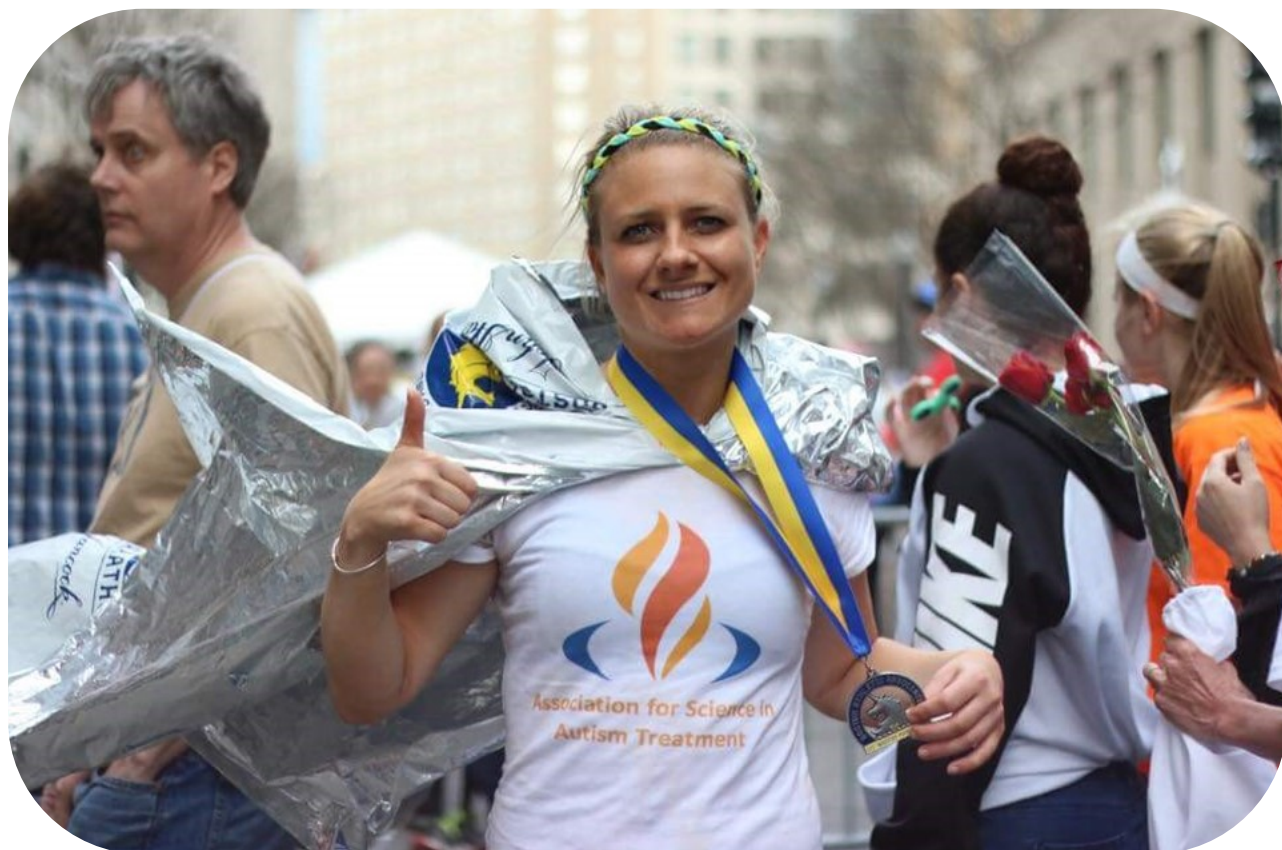
Boston Strong for a Great Cause

Ruth Donlin, MS
ASAT Board Member

The 121st Boston Marathon took place on April 17, 2017, making it one of the longest running foot races in history. The Boston Marathon is held on Patriot's Day and takes place in Massachusetts. Approximately 30,000 runners participated this year, and the event drew over 500,000 spectators.

One of the first-time marathon runners was Laura Shay, who chose The Association for Science in Autism Treatment as her fundraising charity. Laura is a student at Arizona State University (ASU) and is pursuing a Master's in Education in Applied Behavior Analysis: Curriculum and Instruction while working as a Speech Language Pathologist Assistant. She

enjoys working with and providing relief for children who engage in challenging behavior; she is interested in furthering her understanding about the nature of human behavior and interactions in her advanced studies of applied behavior analysis. ABA informs Laura's Speech Language Therapy services as she works in a clinical setting primarily with children who are diagnosed with autism spectrum disorder. She has an extensive background in the behavioral health field and holds a B.A. in Communication Sciences Disorders and another B.A. in Biological Cognitive Psychology, and has worked in the health and human services field for eight years, previously providing direct speech and language therapy services in multiple school settings. Laura is an advocate for



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science and data based research and follows the Association for Science in Autism Treatment closely. Her interest in Applied Behavior Analysis stems from its nature to rely heavily on language and communication.

Laura's ultimate goal is to continuously further her education so that she can better serve struggling individuals and families in the state of Maine. She works to educate families, professionals, and the public about science based treatment for Autism, helping them make informed decisions. Laura chose to run for The Association for Science in Autism Treatment because she says:

"Treatment is key to helping families affected by autism and making it so individuals with autism can be a part of our local communities. I wanted to run for a cause that needs to be recognized more widely. Autism awareness and awareness of effective treatment for autism are two different things. There are still many misconceptions about autism treatment, and we need to create more awareness of the effective treatments that are out there."



Congratulations Laura for completing your first marathon and for choosing ASAT. Please help support Laura Shay and the Association for Science in Autism Treatment by [donating to ASAT through PayPal](#).

ASAT would also like to thank Spectrum Designs for creating the customized ASAT t-shirt worn by Laura for the race. At Spectrum Designs, 75% of all employees are on the autism spectrum. You can learn more about their business and services on their website <https://spectrumdesigns.org/> and [Facebook page](#).



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FROM THE ARCHIVES

Expanding Interests

Tanya Baynham, MS, BCBA
Kansas City Autism Training Center

When working with children with autism spectrum disorder, the need to program for expanding interests is not uncommon. In this installment of From the Archives, Tanya Baynham shares with our readers some extremely valuable ideas regarding how to expand interests in the areas of toy use, play and reinforcers in addition to the positive outcomes that can come from these efforts. She also shares with us the importance of setting goals for expanding interests, suggestions relating to data collection to track progress as well as numerous strategies to get you started.

**Caroline Simard, MS, BCBA
Newsletter Content Coordinator**

My child is doing well with many of his ABA programs, even the ones that focus on play. Unfortunately, he doesn't play with most of the toys that we give him, and he has worked for the same five things since our program began a year ago (marshmallow peeps, Thomas trains, tickles, Wiggles songs, and raisins). What can I do to expand his interests and maybe even get those interests to function as reinforcers for teaching targets?

**Answered by Tanya Baynham, MS, BCBA
Program Director, Kansas City Autism Training Center**

Inherent to a diagnosis of autism is the fact that the child will engage in restricted or repetitive behavior and may also have restricted interests. Expanding those interests, specifically in the areas of toy use and play, is an important programming goal as it can result in a number of positive effects. First, rates of socially appropriate behaviors may increase while rates of inappropriate behaviors may decrease. For example, engaging a child in looking at a book may decrease stereotypic behaviors or passivity (Nuzzolo-Gomez, Leonard, Ortiz, Rivera, & Greer, 2002). Second, interest expansion can lead to new social opportunities for children and enable greater flexibility when bringing them to new environments. For example, a child with a new preference for coloring may

be taken to a restaurant because he will sit and color the menu, or he can attend Sunday school because he will color a picture when directed. Third, the addition of new reinforcers in ABA programs may help prevent satiation or allow you to allocate more highly preferred items for difficult teaching targets and less preferred items for easier targets.

Stocco, Thompson, and Rodriguez (2011) showed that teachers are likely to present fewer options to individuals with restricted interests and allow them to engage longer with items associated with those restricted interests. The authors suggest one possible reason for this; that teachers might be sensitive to the negative behaviors (e.g., whining, pushing the toy away) that can accompany the presentation of a new toy. The results of this study prompt us to be aware of our own role in potentially limiting a child's access to novel experiences or activities and to find effective ways of expanding a child's interests without evoking tears and other negative behavior.

Most importantly we, as parents and intervention providers, must make reinforcer expansion a teaching focus and use data to determine whether our procedures are producing change. One recommendation is to first track the number of different toys and activities with which your child engages to identify current

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patterns. Then, measure the effects of attempts at reinforcer expansion on your child's behavior. Ala'i-Rosales, Zeug, and Baynham (2008) suggested a variety of measures that can be helpful in determining whether your child's world is expanding. These measures include the number of toys presented, number of different toys approached/contacted across a week (in and/or out of session), engagement duration with new toys, and affect while engaging with toys. It is sometimes helpful to track changes across specific categories (e.g., social activities, food, social toys, sensory toys, etc.). If, for example, your child only watches Thomas videos, you may narrow the focus to the category "videos" in order to track expansion of interests to different types of videos. Keeping in mind the previous point about a teacher's role in expanding a child's interests, you may also want to set goals to ensure changes in adult behavior such as, "Present three new items each day."

Once data are being taken, it is important to implement procedures likely to expand your child's interests. One way to expand toy play is to present, or pair, a preferred item with the item you want to become more preferred (Ardoin, Martens, Wolfe, Hilt & Rosenthal, 2004). Here are a few examples:

- Use peeps as the game pieces in a game you want your child to enjoy, imbedding opportunities to eat the peeps at different points during the game.
- Sing a favorite song as you help your child up the ladder of an unfamiliar slide on the playground.
- Tickle your child before turning each page while reading a book.

A second way to expand interests is to think about why your child might engage in those restricted interests. If he likes Thomas because of the happy face, put Thomas stickers on a ring stacker. If he likes Thomas because of the wheels, present other vehicles with wheels. If your child likes peeps because they blow up in the microwave, put Mentos in a cola bottle or use baking soda to make a volcano. If he likes peeps because they are squishy, use marshmallows in art projects or in a match-by-feel game.

A third way to expand interests is described by Singer-Dudek, Oblak, and Greer (2011), who demonstrated

that some children will engage more with a novel toy after simply observing another child receiving reinforcers after playing with it. To apply these findings to your child, give Thomas trains, if they are used as a reinforcer, to a sibling who just played with novel items such as play dough or shaving cream.

The methods described may only be effective in producing functional play if your child has the skills necessary to engage appropriately with the toys. If your child is not spontaneously playing with toys after being taught how to engage with them, consider the following potential reasons: the play skill may not have been taught to a natural criterion where the child has "mastered" it independently, the program may include a verbal instruction required for the child to begin playing, the teacher may place the toy in front of the child or present it in a visually different way from how it would be naturally displayed (e.g., on a shelf instead of on a table or assembled instead of disassembled). Aspects of the context like location of the toy, adult presence and proximity, and whether a toy is assembled or disassembled can become discriminative for playing with the object. If spontaneous play is the goal, consider fading any verbal instructions, adding teaching steps until the child is selecting the toy from a shelf or its natural place in the home, and teaching the child how to initiate the play sequence without any teacher interaction.

Here are some final strategies to consider when expanding your child's interests:

- Prioritize toy rotation. Depending upon the number and diversity of toys with which your child engages, you may rotate toys on an hourly, daily, weekly, or monthly basis. Removing a high preference, commonly used toy from the rotation can result in increased approaches and engagement with other toys.
- Provide the toy that you want to become reinforcing for "free" in addition to the toy your child chooses during a reinforcement break.
- Teach skills that lead to independent initiations of activities (e.g., scanning and selecting among large sets of items or on shelves, requesting items that are out of view, requesting items that are presented on television commercials).

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- Teach the skill of making forced choices (presenting a few options and asking the child to choose) and then offer forced choices of items that you would like your child to explore. Associating these items with choice may motivate your child to engage with them.

If your child does not initiate play, make sure component skills of games are mastered before teaching the play activity. For example, teach “Ned’s Head” or “Memory” once your child can match. Introduce “Hi Ho Cheerio” only after your child can count objects.

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Know Our Sections: Becoming a Savvy Consumer

In Focus on Science we look at the scientific method, particularly as it relates to ASD treatment, and keep an eye out for ways in which we can be effective and savvy consumers.

Focus on Science highlights scientific concepts and methods as they relate to potential autism interventions with the goal of providing families, educators and clinicians with the information they need to be savvy consumers of marketed treatment products and therapies.



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- ★ All families will be empowered with skills in identifying and choosing the most effective, scientifically-validated interventions for their child.
- ★ The media will educate and not confuse parents by providing accurate information and asking the right questions.
- ★ All providers will be guided by science when selecting and implementing interventions and use data to demonstrate effectiveness.

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RESEARCH SUMMARY

Effects of Improvisational Music Therapy on Joint Attention Behaviors

&

A Randomised Group Comparison of Parent Education and Skills Training Intervention

In this issue of SIAT, we summarize two studies involving young children with autism spectrum disorder (ASD). The first looks at the effects of improvisational music therapy on joint attention behaviors. The second looks at the impact of adding parent skills training to parent education on child outcomes, such as social, motor, communication skills, and ASD symptoms. We hope this information is helpful and encourage you to share it with others.

Karen Fried, PsyD, BCBA-D
Research Synopses Co-Coordinator

Kim, J., Wigram, T., & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviors in autistic children: A randomized controlled study. *Journal of Autism and Developmental Disorders*, 38, 1758-1766.

Reviewed by: Sunita Chhatwani, MSc, MEd, and Karen Fried, PsyD, BCBA-D

Why research this topic?

“Joint attention” occurs when two people share a focus on an object or experience. Children with autism spectrum disorder (ASD) commonly have poor joint attention skills. They may not initiate joint attention (e.g., not shifting their gaze between an interesting toy and an adult; not showing anything to anyone) and/or may not respond to other people’s bids for joint attention (e.g., not looking where someone points). Joint attention skills lay the foundation for social communication and interaction. It is, therefore, critical to find effective strategies to improve joint attention.

This study investigated the effect of improvisational music therapy on joint attention in preschool children with ASD. In this approach, the music therapist uses improvised music to respond to the child’s musical and non-musical expressions. The musical interaction is intended to draw the child’s attention toward a shared (or ‘joint’) social experience, thereby

encouraging the child to join in or even initiate new interactions.

What did the researchers do?

Participants were 10 boys with ASD, ages 3-5 years, whose diagnoses were confirmed by independent examination. Developmental assessment indicated that all had moderate to significant developmental delays. Participants were randomly divided into two groups. Group 1 began with improvisational music therapy (by a music therapist) for 12 weeks while Group 2 started play sessions with toys (by a play therapist) for 12 weeks. All sessions occurred once weekly for 30 minutes. Participants had no previous experiences in music therapy or play therapy. After 12 weeks, each group participated in the other intervention for another 12 weeks. A “semi-flexible treatment manual” was developed and used for both conditions. For each condition, a consistent, pre-selected set of materials was made available to participants. For each 30-minute session, in both conditions, the first 15 minutes were led by the child, and the second 15 minutes were directed by the therapist who introduced modeling and turn-taking activities.

All sessions were video recorded and analyzed for eye contact and turn-taking behavior, the dependent measures of joint attention in this study. The primary coder was the first author. The second coder was

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unaware of the order of conditions. In addition, two instruments were used as pre-, mid-, and post-treatment measures of joint attention behaviors. The first, the Social Approach subscale of the Pervasive Developmental Disorder Behavior Inventory (PDDBI), was completed by the mothers of participants and by professionals involved with each participant. The second, the abridged version of the Early Social Communication Scales (ESCS), was completed by independent evaluators unaware of the order of conditions.

What did the researchers find?

Session analysis showed that eye contact and turn-taking occurred for longer durations in the music therapy condition than in the play condition. On the PDDBI, agreement between the mothers and the professionals was low, and neither therapy (music or play) significantly changed participants' social approach scores. On the ESCS, initiating and responding to joint attention improved in both groups, and the improvement appeared greater after music therapy than play therapy, no matter the order of conditions. Increases in joint attention involved "low level behavior" (i.e., making eye contact with the therapist and alternating eye contact between a toy and the therapist). For "high level behavior," including pointing and showing, there were hardly any changes over time, or even a slight worsening.

What are the strengths and limitations of the study?

The strengths of this study included confirming the participants' ASD diagnoses through independent examination and conducting a developmental assessment of each participant. Another strength was using several different outcome measures to judge effects of the interventions.

There were many limitations, however. Children with ASD, especially those with moderate to significant developmental delays, commonly have little or no interest in age-appropriate toys. Therefore, they may have preferred the musical instruments in music therapy over the toys in play therapy, and this difference might account for the larger gains in music therapy. It is a limitation that steps were not taken to select objects for both conditions that were equivalent

in value to the subjects. This likely created a distortion in favor of the music therapy objects, creating the appearance of an effect.

A "semi-flexible treatment manual" was developed and used for both conditions. Future studies might take steps to better ensure the two treatment conditions are well defined, are truly different from each other and are carried out consistently and as intended. It might also be prudent to compare the music therapy intervention to an intervention that already has a strong evidence base for improving social communication and interaction in ASD. Finally, greater care might be taken to control for possible observer bias. In the current study, the first author was the primary coder and the study took place at the first author's private practice music therapy clinic.

What do the results mean?

The results are inconclusive. Further research is needed to determine whether or not music therapy is effective as an intervention for children with ASD.

Tonge, B., Breton, A, Kiomall, M., Mackinnon, A., & Rinehart, N.J. (2014). A randomised group comparison controlled trial of 'preschoolers with autism': A parent education and skills training intervention for young children with autistic disorder. *Autism, 18(2)*, 166-177.

Reviewed by: James Maraventano, Rutgers University

Why research this topic?

Parent training has been found to reduce parents' stress and improve their interactions with their children with autism spectrum disorder (ASD), but effects of parent training on child outcomes have been mixed, with some studies reporting improvements in child outcomes but others not detecting changes. The present study was intended to provide additional information on child outcomes as a result of different models of parent training. It compared parent education and counselling (PEAC) to parent education and behavior management skills training (PEBM) to determine if parent education alone (PEAC) would improve the child's

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communicative and social skills, or if adding a specific parent skills training and coaching component (PEBM) produced better results.

What did the researchers do?

Participants were 103 Australian families of preschool-age children diagnosed with ASD. Families were of diverse social class and ethnic backgrounds. Intervention families were randomly assigned into either PEBM (n = 35) or PEAC (n = 33). There was also a control group (n = 35) that was not randomly assigned and that received neither PEAC nor PEBM. Children were 30 – 68 months old and were receiving community “business as usual” services including preschool, early intervention and speech and/or occupational therapy. The Vineland Adaptive Behavior Scales (VABS) was utilized for pre and post treatment measurement of communication, daily living, social, and motor skills, and problem behavior. Other pre and post implementation measures included the Autism Screening Algorithm and Total Problem Behavior Score from the Developmental Behavior Checklist (DBC).

What did the researchers find?

PEBM was superior to the control group in improving communication, socialization and daily living skills for children with greater delays in these skills at pre-treatment. PEAC was also superior to the control group in improving socialization skills. PEBM but not PEAC was superior to the control group in reducing ASD symptoms. PEBM was superior to PEAC in improving motor skills. The PEBM, PEAC and control groups did not differ significantly on other outcome measures.

What are the strengths and limitations of the study?

This is one of the largest studies available on parent training to increase adaptive behaviors in children with ASD. The study is limited by the non-random assignment to the control group. While another potential limitation to the study is that results are based on parent report, the authors assert that the VABS and the DBC correspond greatly to direct assessments and were structured and conducted by experienced clinicians.

What do the results mean?

Children of parents who received parent education along with behavior management skills training (PEBM) generally had better outcomes than children in parent education alone (PEAC). Both PEBM and PEAC appeared more effective than a no-treatment control. These results suggest that programs such as PEBM should be offered to parents of children with ASD. This study extends previous research on child outcomes as affected by parent training and supports the addition of parental education and skills training to early intervention programming for children with ASD.

CLINICAL CORNER

Teaching Game Playing to Children With Autism

Maithri Sivaraman, MSc, BCBA

Ruth Donlin, MS

Association for Science in Autism Treatment

Playing games with other children is a wonderful way for individuals with ASD to learn important communication and social skills while offering them a structured activity in which they can socialize with other children. In this installment of the Clinical Corner, Maithri Sivaraman and Ruth Donlin describe how to choose games and teach game playing to children with ASD.

Kate Fiske, PhD, BCBA-D
Clinical Corner Co-Coordinator

My son is 5 years old and was diagnosed with autism when he was two. He has responded well to early intervention services in terms of his communication and daily living activities. But it is still challenging for him to play games with his neurotypical peers. When all the kids at a birthday party are playing "Simon Says," my son prefers to play alone with his toys or just watch the other kids playing. I don't know how to teach him to play new games or even identify what kind of games he likes. Could you provide some suggestions?

Answered by: Maithri Sivaraman, MSc, BCBA and Ruth Donlin, MS

The growing awareness about the early signs of ASD has made it possible for an increasing number of children to be diagnosed by the age of 3 years (Stahmer, 2011). Considering the difficulty in building social relationships and peer play that is often associated with ASD it is important that specific instruction on social behaviors in various play situations is provided. Research has shown that extensive and planned interaction with peers facilitates social skill development (e.g., Krantz & Mclannahan, 1993; Baker, Koegel & Koegel, 1998). At your son's age, this interaction primarily occurs during play.

Play has been described as a "child's workshop"

where social rules and consequences are explored (Bruner, 1975). Teaching a game to a child has consequences beyond the game itself: A part from having fun, it could lead to social engagement, formation of friendships and create abundant opportunities for imitation, negotiation, cooperation, and other skills. However, though important, teaching games to children with autism often involves many challenges, such as the play activity not being motivating to the child, the need for intrusive prompting, having to teach the rules of each game, and managing problem behavior, to name a few. Some of these challenges can be overcome by using the strategies described below.

Considerations When Choosing a Game

Choose a game that is a match to the child's developmental level and one that incorporates his or her interests and facilitates social skill development. Games may provide an appropriate social context to the perseverative interests of children with ASD (Koegel et al., 2012; Baker, Koegel & Koegel, 1998). It is a great idea to modify games to accommodate the child's interests. For example, if the child has a keen interest in vehicles, the Red Light/Green Light game can be modified to be played with cars rather than people. A perseverative interest with names of washing machine brands can be accommodated in the same game by asking the child to take a step forward each time one brand name is said or stop when a different brand is said. For a child who likes twirling

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threads, the thread could be at the finish line to motivate the child to “go” during Red Light/Green Light.

Strategies for Teaching Games

Children with ASD are less likely to learn age-appropriate play skills through mere exposure to play materials and peers using those materials. Instead, intervention is often required to teach appropriate play skills directly and explicitly to these children (Lifter, Mason & Barton, 2012; Malone and Langone, 1999). When planning for social interactions and game play with others, the child with autism should understand what to do before being placed in the social play situation and have appropriate supports to avoid failed social experiences that could decrease long-term interest in the activity. Some strategies for teaching games follow.

- **Modeling** - Provide your son with opportunities to observe others playing the game. At this stage, the only expectation is that the child stays within the play area for a few minutes and observes others. No other form of participation/engagement is required. Alternatively, providing a video model of a group playing the same game will serve as a form of priming and prepare the child for the actual experience, as long as the child has learned and is competent with observing of others, in vivo or video.
- **Shaping** - The child could initially engage only in those play actions (relevant to the game) that he can do independently. Subsequently, better performances in these actions can be modeled and expected (Ward, 2011). For example, in a game like Red Light/Green Light, your son may initially just run along with all the other players. It does not matter that he does not stop at the Red Light. But if he/she is successful at this level and shows independent participation, over the course of the next few instances, a play partner could be made to hold hands with your son and have him stop at the Red Light. Gradually, the partner could stop holding hands and independent performance in “red” and “green” can be tested.
- **Prompting** - After being given a few opportunities

to observe others playing the game, some prompting might be required for the child to improve existing play behaviors. In a least-to-most (LTM) prompting hierarchy, the least intrusive prompts are provided first. More intrusive prompts are provided only if the expected behavior does not occur at the present level of prompting. For example, in the Red light/Green light game, if a child does not start running when the leader says “green,” the teacher might initially say, “What should you do now?” A gesture to move or a gentle push may be provided if the student does not respond to the teacher’s question. One LTM prompt hierarchy that is often used to teach these kinds of skills is indirect verbal, direct verbal, gestural and a physical prompt, in order of increasing intrusiveness (Cooper, Heron & Heward, 2007; Davis-Temple, Jung & Sainato, 2014; Libby, Weiss, Bancroft & Ahearn, 2008). For example, when the leader says green, an indirect verbal prompt could be “What should you do now?” while a direct verbal prompt would be saying, “Run.” An example of gestural prompt for this situation would be a hand gesture indicating the child to move in a certain direction whereas a physical prompt would be to hold the child’s arm and gently push him forward. In contrast, a most-to-least (MTL) prompting hierarchy involves providing the most intrusive prompt initially. The prompt is then faded gradually to facilitate independent performance. Using the previous example, an MTL prompt strategy would begin first with a physical prompt and then fade to a gestural prompt, direct verbal, indirect verbal prompt, and finally allow for independence as the child is successful. The prompting techniques used should be tailored to each learner. Because LTM prompting allows the child to attempt the skill independently first, MTL prompting is recommended if errors (which can be more common with LTM) have been found to impede the child’s learning. LTM can be used for children who show rapid acquisition of skills and are familiar with this prompting strategy (Libby, Weiss, Bancroft & Ahearn, 2008).

- **Positive Reinforcement** - Try to use naturally occurring reinforcers as much as possible. Exaggeration of facial expressions and emotions, and making funny noises could be a part of the game itself to make the activity more enjoyable.

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For instance, stopping during the Red Light could be accompanied by exaggerated body postures and funny facial expressions. Also, if the child is familiar with a token system, it could be extended to the game as a “points table” where everyone’s scores in the game are recorded. The winner of the game might then be given a chance to choose the next activity. Reinforcers that are a natural result of play are recommended over edibles/tangible items because they can be easily transferred to the natural environment during play with typically developing peers (Stokes & Baer, 1977). Maximizing the use of activities within the game that can serve as reinforcers will promote generalization. Learning to play a game in one situation and being able to do it flexibly in other similar but different situations requires the events within the game (stopping at “Red Light” with a screeching sound like a car, jumping and saying “Woohoo” at the finish line) to serve as reinforcers as opposed to using edible or tangible items which may not be available everywhere.

- **Chaining** - In the context of simple games with a consistent, predictable sequence of play such as “Hi-Ho-Cherry-O” or “Candy Land”, the game could be broken down into a series of simple steps (task analysis). Teaching one step at a time to mastery before introducing the other steps could simplify the game for the child. For instance, in the game Candy Land, your son might initially be required only to pick up the card and label the color, while the parent or teacher helps him complete all the additional steps on his turn (e.g., finding his piece and moving it to the corresponding color). Following success at this step, he could be expected to pick up the card, label the color and also move his piece on the board. Subsequently, telling a peer to take a turn, waiting appropriately for his turn, setting up the game and cleaning up could be added to the list of expected behaviors.
- **Scripting** - Playing games provides numerous opportunities to develop or increase communication skills such as imitating words, making comments (“This is fun,” “Your turn”), making requests (“Help”) and initiating communication (“Let’s play”). Visual script interventions have been shown to be effective

with children with autism, including those with minimal language (e.g., single spoken words, Krantz & McClannahan, 1998) and those with extensive verbal skills but poor social skills (Krantz & McClannahan, 1993). Scripts typically are written or pictorial appropriate phrases or sentences presented during play to evoke responding. For example, a script during the Red Light/Green Light game can serve as a prompt for social greetings (“Hi, let’s play”), asking for a turn (“My turn to be the leader”) and making comments (“We’ve all stopped like statues!”).

Assessing motivation - How to tell if the child is interested?

Gauging child motivation for an activity is as important as knowing how to teach a game. Being indifferent to a child’s interest level and focusing only on the process can impede his/her ability to play games (Taylor et al., 2005). The overwhelming urge to teach the child to play by all the rules of the game on the very first opportunity can be truly aversive for the child (and the parent or teacher!) and lead to problem behavior. A closer observation might reveal that problem behavior occurs when the child’s interest in the game starts to wane and continued engagement is expected.

This challenge can be overcome by taking motivation into consideration and choosing games that have components which you know the child enjoys. This increases the likelihood that the learner will exhibit independence in at least one of the expected play behaviors during the game. The Red Light/Green Light game might work well for children who like to run or be outdoors; Simon Says might work for children who have a good imitation repertoire; Hangman may be motivating for children who like letters; and simple board games like Tummy Ache/Pizza Pizza (Orchard Toys) may be enjoyed by children who prefer visual stimuli and matching.

Additionally, here are some ways of measuring motivation during the game (Ward, 2011):

1. **Mands/Requests** - Did the child request for the game after a few exposures? Did he/she ask for a turn to hold up the colored cards and say “red” and “green”?
2. **Initiations** - did he/she make any initiations

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during the game (e.g., asking a partner to “stop” when they didn’t)?

3. Responses to partner initiations - does the child respond to play partners (e.g., moving forward when a partner asks him to do so)?
4. Affect - Does the child seem happy? Is he/she smiling, jumping, or laughing?
5. Independent play actions - Does the child run by him/herself during “green”? Or go back to the starting line at the end of one round?

If the game has been broken down into doable steps with appropriate reinforcement and the child is still not initiating or displaying independent play actions, these are clear indications of low motivation in the game, which can be also due to task difficulty. If such situations persist, it is best to choose a different game. Identifying a child’s disinterest and knowing when to stop, or modifying a game in a manner that might enhance motivation, can facilitate success.

Motivation can be fleeting: what was fun yesterday might not be fun today. But being proactive about gauging these variations is what should be lasting.

Summary

We have learned many effective ways to teach games over the years (Jung, 2013; Krantz & McClannahan, 1998; Maurice, Green & Luce, 1996; Stahmer & Schreibman, 1992). Since playing games is an important activity among typically developing children, play activities serve as an opportunity for children with ASD to learn appropriate social behaviors (Davis-Temple, Jung & Sainato, 2014). Whatever the goals associated with each game, adding “having fun” as one of them, and identifying and monitoring observable measures of enjoyment, may be the key to successful game instruction. Being process-oriented and showing our kids that games can be fun is more important than playing the game the right way.

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IS THERE SCIENCE BEHIND THAT?

Gluten-Free and Casein-Free Diets

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Parents of children with autism often feel a sense of urgency to find a treatment that will help their children realize their fullest potential and live an independent life. This sometimes makes families anxious to try new treatments that tout promising claims, and makes them impatient to wait on scientific evidence to support these claims. One such widely used intervention is the gluten-free and casein-free (GFCF) diet, which completely eliminates gluten (found in wheat products) and casein (found in dairy products) from the individual's diet (Elder, 2008). In an online survey conducted in 2006, up to 27% of parents of children with autism reported using a GFCF diet (Green et al., 2006). Additionally, Perrin et al. (2012) conducted a large-scale survey including over 3,000 individuals with autism spectrum disorder (ASD) and found 17% of the individuals with ASD used special diets of some kind, with the most popular of these diets being a GFCF diet.

What is the Conceptual and Scientific Link Between ASD and GFCF Diets?

The exact etiology of autism is still unknown, leading researchers to consider many possible factors, diet being one. Food restriction as a strategy for changing behavior is not new, with research dating back to the 1920s. The "opioid-excess theory" (Panksepp, 1979) or "leaky-gut syndrome" (Shattock & Whiteley, 2002) has been one of the predominant conceptualizations supporting the role of food and

diet in autism symptomology. Panksepp (1979) proposed that symptoms of autism may be due to excessive opioid activity. Shattock and Whiteley (2002) proposed that children with autism have abnormal leakage from their gut (due to increased intestinal permeability). Both gluten and casein are broken down in the gut into compounds with opioid properties. Therefore, some suggest that the abnormal leakage from the gut allows the opioids to pass into the central nervous system and produce increased brain opioid activity and ultimately, disrupt brain

function (Christison & Ivany, 2006). Much of the research surrounding the biological connections of gluten and casein and autism symptoms stems from an article by Wakefield and colleagues (1998) in which the authors suggested three potential environmental links to autism: 1) a potential link between behavior abnormalities and variations in gastrointestinal functioning, 2) a potential link between autism and

the Mumps, Measles, and Rubella (MMR) vaccination, and 3) a potential link between autism and a deficiency in vitamin B12. However, due to undisclosed financial interests of the authors, significant inaccuracies in the paper, and what eventually was shown to be deliberate fraud, Wakefield and colleagues were found guilty of ethical violations and scientific misrepresentation. The findings of the research were eventually rejected and the article was pulled from the journal.

Other researchers investigating the opioid-excess

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“However, due to undisclosed financial interests of the authors, significant inaccuracies in the paper, and what turned out to be deliberate fraud, Wakefield and colleagues were found guilty of ethical violations and scientific misrepresentation. The findings of the research were eventually rejected and the article was pulled from the journal.” “Support for the GFCF diet comes primarily from clinicians, parents, and educators and is based largely on testimonials.”

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theory often produced conflicting results. Support for this theory is drawn from reports of increased intestinal permeability as well as increased urinary peptide levels. For example, D'Eufemia and colleagues (1996) found abnormal intestinal permeability in 43% of their tested population with autism, but in none of their control population. Contrary to this study, Robertson and colleagues (2008) found no gastrointestinal differences between children with intellectual or developmental disabilities and typically-developing children. Likewise, Reichelt, Knivsberg, and Nodland (1991) found increased urinary peptide levels in children with ASD, but Cass and colleagues (2008) found no significant differences in urinary peptide levels between children with ASD and typically-developing children.

Conceptually, a GFCF diet may seem like a logical treatment for ASD because it eliminates two compounds with opioid properties (i.e., gluten and casein) from the diet. If individuals with ASD do indeed have increased opioid levels and increased intestinal permeability (the combination of which may lead to a disruption in brain function), then eliminating food with opioid properties should decrease opioid levels and, in turn, eliminate or at least decrease disruption in brain function. However, these suggested gastrointestinal differences (i.e., increased opioid levels and increased intestinal permeability) in individuals with ASD are not consistently observed, thus diminishing the conceptual and scientific link between ASD and GFCF diets.

What Does Research Have to Say About ASD and GFCF Diets?

Research on specifically restricting gluten and casein in the diet of children with autism is relatively limited, despite its popularity as a treatment for autism (Elder 2008). Proponents of a GFCF diet suggest benefits across a wide range of symptoms related to autism, with changes in social engagement and verbal skills being the most commonly noted

(Christison & Ivany, 2006). However, support for the GFCF diet comes primarily from clinicians, parents, and educators and is based largely on self-report, not direct measurement (Seung, Rogalski, Shankar, & Elder, 2007), thus limiting the validity of the findings.

Researchers investigating the behavioral effects of a GFCF diet on children with autism produce conflicting results. Knivsberg and colleagues have conducted several studies evaluating the effects of GFCF diets on behavior as well as biological markers of individuals with autism. Among the most experimentally rigorous, Knivsberg, et al. (2002) compared a test group of children who received a GFCF diet to a control group of children who experienced no change in diet. Both test and control groups consisted of children with autism and

abnormal urinary peptide patterns. A single-blind design was used and behavior measurements were collected using validated measurement instruments in baseline and then again one year later. Results suggested significantly greater improvement in the diet group as compared to the

control group across ratings of attention, social and emotional behaviors, communicative ability, cognitive factors, sensory/motor behaviors, and total impairment. However, this study (like most of the research on GFCF diets) was limited because parents, teachers, and participants were not blind to the treatment conditions, and the primary data were subjective in nature and derived from interviews with the parents.

Other researchers have completed studies with better experimental rigor to address some of these experimental limitations. For example, Elder and colleagues (2006) completed a double-blind test that included direct behavioral observations, biological tests (i.e., urinary peptide levels), and validated measurement instruments (i.e., Childhood Autism Rating Scale; CARS). This study addressed the limitation of parents, teachers, and participants knowing the treatment conditions by using a double-blind test. It also addressed the limitation of relying

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“However, this study (like most of the research on GFCF diets) was limited because parents, teachers, and participants were not blind to the treatment conditions, and the primary data were subjective in nature and derived from interviews with the parents.”

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on interviews for detecting behavior change by directly measuring differences in behavior using behavioral observations before and after implementing the GFCF diet. With these limitations addressed, Elder et al. (2006) found no significant differences between the test and control group across the direct behavior observations, the urinary peptide levels, and the CARS assessment.

More recently, Hyman and colleagues (2016) conducted a double-blind test in which 14 children with autism were placed on a GFCF diet. Following an extended period of time (i.e., 2-6 weeks) on a GFCF diet, food items containing gluten and/or casein were introduced into the participants' diet once a week for 12 weeks, unbeknownst to the participants. Data were collected on three domains that are often identified by proponents of GFCF diets as targets of the diet. Specifically, data were collected on physiologic functioning (i.e., bowel movements), challenging behaviors (i.e., sleep, activity, attention) and behaviors associated with ASD (i.e., sensory motor behavior, social relationships, affectual reactions, sensory responses, language). Data were collected on observed behaviors using well-established rating scales. Like Elder and colleagues (2006), Hyman and colleagues found no statistically significant differences in physiologic functioning, behavior problems, or ASD symptoms when children followed a GFCF diet as compared to when gluten and casein were reintroduced into their diet.

In addition to studies that utilize group design, Irvin (2006) utilized a within-subject design to evaluate the effects of the GFCF diet on the rate of problem behavior exhibited by a 12-year-old boy diagnosed with autism and an intellectual disability. This design allows for rigorous experimental control because it controls for biological, environmental, and/or behavioral differences that may exist across participants in a group design. Specifically, Irvin conducted an assessment of problem behavior under various environmental conditions within two diet phases (i.e., GFCF and regular diet). Results

suggested that problem behavior did not decrease during the GFCF diet phase as compared to the regular diet phase. That is, the absence of gluten and casein in this participant's diet did not result in a decrease in problem behavior. Interestingly, Irvin also reported a marked increase in meal refusal during the GFCF diet phase. This is important to note because GFCF diets are suggested to be associated with health risks due to the decreased nutrient intake (e.g., protein; Hediger et al., 2008). Any health risks due to a decreased nutrient intake are likely to be exacerbated if meals in general are refused.

Although these more recent studies begin to address the limitations of previous research, they are still limited in terms of using relatively small sample sizes and not assessing the impact of the diet over a long period of time. Some research has suggested behavior change as a result of the GFCF diet does not occur

immediately and instead occurs after several months of exposure to the diet (Seung et al., 2007). Nonetheless, when major limitations to experimental rigor are addressed (e.g., participants are unaware of treatment phase, behavioral changes are based on direct observation), research tends

“When major limitations to experimental rigor are addressed (e.g., participants are unaware of treatment phase, behavioral changes are based on direct observation), research tends to suggest GFCF diets do not treat symptoms associated with ASD.”

to suggest GFCF diets do not treat symptoms associated with ASD.

Financial Cost and Health Risks Associated With GFCF Diets

In addition to the mixed research results, there are other factors to consider when evaluating GFCF diets as a treatment for ASD. Stevens & Rashid (2008) estimated that, on average, it costs 242% more to buy gluten-free foods as compared to its gluten-containing counterparts. The price difference ranges from 32% among meats to 455% among soups and sauces. Additionally, placing a child on a GFCF diet may be socially stigmatizing because the child cannot eat the same food as his or her peers (Mulloy, et al., 2009).

Finally, GFCF diets may be associated with health risks because they are often associated with diminished essential nutrients. Hediger and

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colleagues (2008) found significantly reduced bone thickness (which leads to increased fracture risk) in boys on a casein-free diet as compared to boys on a minimally restricted or unrestricted diet. The authors suggested this may be due to the decreased calcium and vitamin D intake associated with a casein-free diet. Similarly, Arnold, Hyman, Mooney, and Kirby (2003) found that children on GFCF diets have significantly poorer protein nutrition than children on unrestricted diets, potentially placing developing brains at risk for protein malnutrition. In a comprehensive review of research regarding feeding problems and nutrient status of children with ASD, Sharp and colleagues (2013) found children with ASD are significantly more likely to experience feeding problems as compared to their peers. Additionally, a nutrient analysis indicated a significantly lower intake of calcium and protein for children with ASD in general. This is potentially significant because children with ASD are likely to exhibit behavioral rigidity which often leads to a preference for snack foods and the consumption of fewer vegetables and fruits as compared to typically-developing peers (Foxx & Mulick, 2016). Thus, a child with ASD may already be at risk for detrimental health side effects associated with a diet low in calcium, vitamin D, and protein (Sharp et al., 2013). A child with ASD who also consumes a GFCF diet may essentially double his or her risk for detrimental health side-effects associated with a diet low in essential nutrients.

Future Research

If one felt compelled to investigate these diets further, future research may focus on: a) using a larger sample size for group studies, b) conducting studies utilizing within-subjects designs to control for individual differences often seen across individuals with ASD, c) conducting longer baseline and test periods to ensure the diet is in place long enough to capture any results, and d) continuing to utilize direct behavior measurements and double-blind tests (Elder, 2008). Additionally, future research may consider whether positive outcomes associated with GFCF diets are due to the absence of gluten and casein or simply due to a more nutritious diet that may be associated with a diet free of gluten and casein. Because children with ASD are likely to consume a limited diet (that includes a preference for snack

foods), a GFCF diet may simply result in the consumption of a more nutritiously balanced diet because it likely eliminates foods low in fiber or high in fat and increases the consumption of fruits and vegetables. Additionally, it may eliminate excessive intake of dairy products which can lead to constipation. It is possible that positive behavior change may be observed simply because the individual is consuming a healthier diet and thus, feels better physically (e.g., more energy, eliminate constipation; Foxx & Mulick, 2016).

What is the bottom line?

If any child is allergic to gluten or casein, then the GFCF diet should be considered. However, without a clear medical necessity, until further research suggests a strong causal relationship between the GFCF diet and specific and measurable positive changes in socially important targets of individuals with autism, it should not be used to treat this disorder (Mulloy et al., 2009). The biological findings surrounding the opioid-excess theory are limited and mixed. The behavioral changes resulting from the use of a GFCF diet with children with autism are limited and mixed. The financial cost and associated health risks further suggest avoiding a GFCF diet as a treatment for autism. Diet changes should always be decided upon and closely monitored by a physician. Additionally, parents choosing to use this treatment should weigh all costs associated with the diet (e.g., money, time, ability to evaluate effects, health status of child, social stigmatization) against the uncertain benefits.

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