RESEARCH SUMMER 2023

News and Notes About Scientific Research on ASD and Other Developmental and Behavioral Disorders



EDITORS:

Bill Ahearn, PhD, BCBA-D, LABA Director of Research

Eileen Roscoe, PhD, BCBA-D, LABA Director of Behavior Analytic Research

PUBLISHED BY:

The New England Center for Children® 33 Turnpike Road Southborough, MA 01772 p: (508) 481-1015 www.necc.org

Recent Developments in ASD Prevalence and Diagnosis

Bill Ahearn, PhD, BCBA-D, LABA Director of Research

In March of this year, the Centers for Disease Control and Prevention (CDC; Maenner, M.J., Warren, Z., Williams, A.R. et al., 2023) released the results of the findings from its Autism and Developmental Disabilities Monitoring network (ADDM) project. The project involves ongoing surveillance at 11 sites across the country (5 sites are being added for future surveillance efforts). The focus of this project is to estimate prevalence at ages 4 and 8 and the results represent a completed data set from 2020. Children were documented as having autism if they either received a diagnosis through a developmental evaluation, were classified with a special education eligibility for autism intervention or were given a medical code via the ASD International Classification of Diseases (ICD) tool. Four-year-olds were considered suspected to have autism if a qualified professional indicated that ASD may be present. Autism prevalence was estimated to have increased to 1 in 36 children at the age of 8 (the prevalence estimate from the data generated in 2018 was 1 in 44). The range of prevalence is quite varied across sites with the Maryland monitoring site obtaining an estimate of 1 in 43 while the California site estimated 1 in 22. The trend of increased prevalence has continued across the years that the ADDM network project has been in place and is thought to be a product of increased recognition of the disorder but other variables, such as a true increase in prevalence, cannot be ruled out.

The ADDM project is important, in part, because understanding the number of people affected by autism can guide governmental and health care entities in determining the need for a variety of ser-

vices across the lifespan. Some other interesting findings from this study include ASD prevalence being estimated to be higher in Hispanic, non-Hispanic Black, Asian/Pacific Islander, and multi-racial children than in non-Hispanic White children. Historically, non-Hispanic White children have been more likely to be identified as having autism than the other racial/ethnic groups. It's possible that the recognized prevalence disparity among these groups in the past has led to more diagnostic and clinical services targeting underserved populations. It is also interesting to note that about half of the 4-year-olds who had also received intelligence testing, were determined to have an intellectual disability. This last point is notable in light of another recent publication generated by the ADDM network.

Autism has long been recognized as a heterogeneous condition presented differently from person to person. Recently, there have been discussions about the need to recognize that there are those diagnosed with autism who are profoundly impacted. Profound autism has been used to refer to individuals with an autism diagnosis who are nonverbal, or minimally verbal, with an actual or estimated IQ below 50. Many non-vocally verbal individuals learn to communicate, especially with educational and motivational supports, but the impact of profoundly impairing autism has implications across the lifespan and has not been well studied. Recently, Hughes and colleagues (2023) analyzed the records of over 20 thousand 8-year-olds with an autism diagnosis. They found that just under 27% of those children were profoundly impacted by autism. These profoundly autistic children were more likely



to be preterm or with a low birth weight, have self-injurious behavior, and a seizure disorder than those with non-profound autism. They were also more likely to come from a lower socioeconomic background, come from a racial/ethnic minority group, and be female. There is a good deal of controversy surrounding the use of "profound autism" as a term as well as whether the use of person-first language stigmatizes the person given that label. However, the importance of recognizing those who require more resources and enhanced support throughout their life is a societal problem that is best met with thoughtful planning. Any diagnosis can be seen as an unwanted label but as long as the terms used in diagnosis are not demeaning or judgmental, they are most likely more helpful than they are stigmatizing.

Hughes MM, Shaw KA, DiRienzo M, et al. The Prevalence and Characteristics of Children With Profound Autism, 15 Sites, United States, 2000-2016. Public Health Reports. 2023;0(0). http://doi:10.1177/0 0333549231163551

Maenner MJ, Warren Z, Williams AR, et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. MMWR Surveill Summ 2023;72(No. SS-2):1-14. DOI: http://dx.doi.org/10.15585/mmwr. ss7202a1

How can clinicians safely treat problem behavior maintained by negative reinforcement?

Eileen Roscoe, PhD, BCBA-D, LABA Director of Behavior Analytic Research



A common intervention for treating problem behavior maintained by negative reinforcement is differential reinforcement of alternative behavior (DRA). In this intervention, the maintaining reinforcer (i.e., escape from an aversive situation) is delivered contingent on an appropriate alternative behavior, either a communication response (e.g., asking for a break) or task completion. In addition, DRA typically includes an extinction component in which escape is no longer provided following problem behavior. In the case of escape-maintained problem behavior, it can be difficult or impossible to eliminate escape following problem behavior, as this often requires a clinician to continue to present prompts for the individual to complete the task or activity. In addition to extinction being difficult or impossible to implement consistently, continued presentation of prompting may result in temporary increases in the target problem behavior or aggression. Given these practical concerns regarding the use of extinction, it is important to evaluate treatment approaches that can be effective without an extinction component.

An alternative treatment approach is the use of DRA without extinction. DRA without extinction involves a concurrent schedule because there are multiple response options (i.e., problem behavior and appropriate behavior) that are simultaneously available. Each response option is associated with an independent schedule of reinforcement. When DRA without extinction is used for treating escape-maintained problem behavior, the problem behavior continues to result in escape. Therefore, clinicians must modify the value of the reinforcer provided for the appropriate alternative behavior relative to the problem behavior to increase the likelihood that the individual will engage in appropriate behavior instead of problem behavior. One example of increasing the value of the reinforcer for an alternative behavior is to deliver both a break and a preferred activity for task completion and to only provide a break for problem behavior. Individuals will likely engage in task completion because the reinforcer (break plus a preferred activity) is more valuable than a break alone.

Another way to increase the value of the consequence for appropriate behav-



ior relative to that for problem behavior is to provide more reinforcement for the appropriate behavior than problem behavior has produced. For example, one could provide a 240-s break for task completion and only a 10-s break for problem behavior. Because the duration of reinforcer delivery is substantially increased for the appropriate behavior relative to the problem behavior, it is more likely that the individual will engage in appropriate behavior instead of the problem behavior. An example of providing differential stimulus magnitudes during DRA without extinction was illustrated in a study conducted by Rogalski et al. (2020). Three individuals with autism spectrum, who were reported to exhibit problem behavior when asked to complete a task or activity, participated in this study. First, the authors conducted a functional analysis to identify the cause of participants' problem behavior. The results of the functional analysis showed that participants' problem behavior was maintained by escape from tasks. Next, Rogalski et al. conducted DRA without extinction and compared various differential magnitudes for task completion and problem behavior. During a large differential magnitude condition, task completion resulted in 240-s escape and problem behavior resulted in 10-s escape. During an equal differential magnitude condition, task completion and problem behavior both resulted in 30-s escape. During a moderate differential magnitude condition, task completion resulted in 90-s escape and problem behavior resulted in 10-s escape. For all participants, problem behavior decreased during only the large differential magnitude condition, suggesting that providing differential escape magnitudes for task completion relative to problem behavior can be effective. The implication of this finding is that manipulating stimulus magnitude (i.e., the duration of escape) is a viable treatment for escape-maintained problem behavior when extinction is not possible.

Another important consideration when evaluating interventions for decreasing escape-maintained problem behavior is to make the intervention more practical by reducing the frequency of reinforcer delivery. However, when the frequency of reinforcer delivery is reduced such that it no longer consistently follows appropriate behavior, resurgence or increases in problem behavior often occur. This is particularly likely when extinction is not in effect because problem behavior consistently continues to produce reinforcement (i.e., escape from the task). Therefore, a concern when using DRA without extinction is whether treatment effects will maintain when various treatment challenges arise (e.g., when an alternative response no longer consistently results in reinforcer delivery). A potential intervention strategy that addresses this problem is to strengthen and reinforce multiple forms of appropriate behavior. By teaching two appropriate alternative responses, one can consistently result in reinforcement while the reinforcement schedule for the other response is grad-ually thinned.

An example of this approach was illustrated in a study by Fleck et al. (2022). First, the authors conducted a functional analysis to identify the maintaining variable of participants' problem behavior. For two of the participants, problem behavior was maintained by escape from demands. Next, the authors conducted a treatment phase consisting of two conditions that were alternated. In both conditions, the treatment was DRA without extinction (i.e., problem behavior continued to produce reinforcement). In one condition, a single alternative response (task completion) resulted in reinforcement. In the other condition, two alternative responses (task completion and a communication request) resulted in reinforcement. Following the DRA treatment phase, the treatment-challenge phase was initiated. The same two conditions were alternated. However, task completion (one of the alternative responses) no longer resulted in reinforcement. Substantial increases were observed in the condition that was previously associated with only one alternative response. By contrast, only minimal and brief increases were observed in the condition that was previously associated with

two alternative responses. The results of this study contribute to the research literature by showing that DRA without extinction was effective in decreasing escape-maintained problem behavior. In addition, this study illustrated the utility of reinforcing two different alternative responses (a communication request and task completion) to promote sustained reductions in escape-maintained problem behavior when reinforcement is no longer in effect for one of the responses. By continuing to reinforce a communication request while the reinforcer for task completion is systematically reduced, treatment effects will maintain at more manageable schedules.

Fleck, C. R., Bourret, J. C., & Jehle, E. R. (2023). Concurrent schedules of differential reinforcement of alternative behavior in the treatment of problem behavior without extinction. *Journal of Applied Behavior Analysis*, 56(3), 623–627. https:// doi.org/10.1002/jaba.987

Rogalski, J. P., Roscoe, E. R., Fredericks, D. W., & Mezhoudi, N. (2021). Negative reinforcer magnitude manipulations for treating escape-maintained problem behavior. *Journal of Applied Behavior Analysis*, 53(3), 1514–1530. https://doi. org/10.1002/jaba.683



RESEARCH PRESENTATION HIGHLIGHTS

Teaching Children With Autism to Respond Cooperatively in the Presence of Law Enforcement Officers

EDITOR'S NOTE:

An important foundational skill for individuals with autism is learning to cooperate when approached by a law enforcement officer. In the presentation below, the authors presented a study that used behavior skill training (instructions, modeling, rehearsal, and feedback) to teach three adolescent individuals with autism to stop, orient toward the officer, and hold out their hands when spoken to by an officer. The authors assessed performance across multiple contexts and statements made by a uniformed law enforcement officer. Results showed that all participants demonstrated criterion performance following training.

DOMINIQUE FISHER (The New England Center for Children; Western New England University), Chata A. Dickson (New England Center for Children; Western New England University).

Abstract: Individuals with autism have been shown to be at a higher risk than those without disabilities for law enforcement officer (LEO) contact. A concurrent multiple probe across participants design was used to evaluate the effects of a treatment package that included behavioral skills training and multiple exemplar video training to teach 3 adolescents with autism to respond cooperatively in the presence of LEOs. Training and generalization probe contexts were defined by combinations of outdoor settings and statements made by a uniformed LEO or actor. When spoken to by an LEO or actor, a participant received a maximal score of 3 points if they stopped, oriented toward the LEO, and calmly held their hands out so that they were visible. Prior to instruction, average scores for the 3 participants were 1.2, 1.7, and 1.8. Following training, participants achieved a score of 3 during all generalization probe trials across contexts and formats. Additionally, stakeholders reported high social validity for the goals, procedures, and outcomes of the training. This study extended previous literature that used simulated training to establish desired responding in the presence of LEOs by evaluating performance in situ, and by evaluating stimulus generalization across contexts.

An Evaluation of Strengthening Precursors to Increase Task Completion

EDITOR'S NOTE:

Another important skill to teach individuals with autism is completion of academic tasks. One way to increase task completion is by teaching task-related behavior that precedes task completion, often referred to as precursor behavior. Examples of such precursor behavior for task completion include sitting in one's seat and orienting towards the task. In the study below, the authors presented data on whether teaching these precursor responses would result in increases in task completion in the absence of direct instruction. For two participants, teaching precursor responses was sufficient to increase task completion, whereas for two other participants direct teaching of task completion was necessary.



JACQUELINE ROGALSKI (New England Center for Children; Western New England University), Elizabeth Prescott (The New England Center for Children and Western New England University), Eileen M. Roscoe (The New England Center for Children).

Abstract: A common childhood problem that has been correlated with poor social, academic, and behavioral outcomes later in life is a lack of task completion. One empirically validated method for increasing task completion in typically developing preschoolers is to teach individuals to emit precursors to task completion such as making eye contact and stopping competing activities in response to their name. These results suggest that training precursors is sufficient to increase task completion without direct intervention for compliance. The purpose of this study was to extend this line of research by evaluating a similar intervention with four individuals with developmental disabilities during discrete trial instruction. Additionally, the current study extended previous research by evaluating if treatment effects generalized to task completion with untrained instructions as well as to instructions delivered via a telehealth platform. Treatment components included prompting and reinforcement. For two participants, prompting and reinforcement of precursors was sufficient to increase task completion and the outcome generalized to task completion with untrained instructions. For the remaining two participants, prompting and reinforcement of task completion was necessary to increase their task completion with both the target task and a generalization task.

Comparing Vocal and Textual Feedback in Behavioral Skills Training With Parents via Telehealth

EDITOR'S NOTE:

Another important area of research being conducted at NECC involves parent training. In the study below, the authors presented data on an evaluation of different instructional strategies for remotely teaching parents a behavior analytic program, via telehealth, to facilitate their child's task engagement. The authors found the training was effective in facilitating correct implementation of the behavior analytic program.

MADELYN DOUGLAS (The New England Center for Children), Cammarie Johnson (The New England Center for Children; Western New England University; Simmons University).

Abstract: Extensive research demonstrates that behavioral skills training (BST) is effective in training a wide range of skills, including training parents to implement behavior analytic teaching methods. In a literature review, the feedback component of BST was often not technologically described, which hinders potential replications of BST studies. A technological definition of feedback would include when and where it is delivered, what is delivered, how and by whom it is delivered, and how many feedback statements are given, with specific examples of the feedback given. The purpose of this study was to compare the effectiveness and efficiency of preferred vocal and textual feedback in behavioral skills training delivered via a video conference application. A secondary goal was to serve as a technological application and description of feedback. An alternating treatment, nonconcurrent multiple baseline design across 2 parents of children with autism was used to teach two craft activities. Reliability measures were collected on the dependent and independent variables and were above 90%. Results did not suggest that one feedback condition was more effective or efficient than the other. A post-study, social validity survey indicated that parents valued the training and were confident in their ability to perform the activities they learned.

A Component Analysis of Self-Monitoring for Increasing Task Engagement

EDITOR'S NOTE:

One way to facilitate independence among individuals with autism is to conduct interventions that allow for reduced caregiver support. An example of such an intervention is teaching the individual to self-monitor and record their own behavior. In the following presentation, the authors evaluated a self-monitoring intervention for increasing appropriate task engagement in an individual with autism. The authors found that providing self-monitoring materials and delivering reinforcement for accurate self-monitoring was effective in maintaining increases in an individual's vocational task engagement.



LAUREN RAE (The New England Center for Children and Western New England University), Eileen M. Roscoe (The New England Center for Children), Erin S. Leif (Monash University), Sam Sheets (Advocates).

Abstract: Self-monitoring as part of a multiple-component in-

tervention has been found to be an effective treatment approach for increasing various skills, including leisure-item engagement and social interaction. A potential benefit of self-monitoring is that it can be used to facilitate maintenance of skills. However, because self-monitoring is typically combined with other treatment components (e.g., differential reinforcement of alternative



behavior; DRA), the independent contribution of self-monitoring for increasing skills remains unclear. In the current study, five young adults who exhibited low levels of independent vocational engagement participated. Three analyses were conducted: a comprehensive training procedure for increasing accurate self-monitoring, a component analysis of a self-monitoring intervention for increasing vocational task engagement, and a treatment preference assessment to assess the social acceptability of self-monitoring. For all participants, self-monitoring with DRA for accuracy and engagement was necessary to increase vocational task engagement. However, performance maintained for two of five participants when the DRA contingency for engagement was removed. Interobserver agreement data were collected for 33% of sessions and averaged 95.3% for task engagement across all participants.

Subtyping Stereotypy: Level of Differentiation in the FA is Predictive of Responsiveness to Treatment

EDITOR'S NOTE:

Individuals with autism often exhibit repetitive and restrictive behavior that is maintained by automatic reinforcement (i.e., it seems to be maintained by the sensory consequences directly produced by the response) and is difficult to treat. In paper below, the authors presented an intervention strategy that involved reviewing functional analysis results to help predict the type of treatment that may be most effective for decreasing automatically reinforced stereotypy. The authors reviewed functional analysis and treatment data from 15 individuals with autism who participated. Participants' stereotypy was successfully treated from presenting alternative activities and prompting functional engagement with those activities as needed.



TIAGO SALES LARROUDÉ DE MAN (Universidade Estadual de Feira de Santana/Western New England), William H. Ahearn (New England Center for Children), Julia Lynne Touhey (New England Center for Children), Haley Steinhauser (Melmark New England; Regis College).

Abstract: The general purpose of this study was to determine whether the subtyping methods developed to analyze automatically reinforced self-injury (SIB), described by Hagopian and colleagues (2015/2017), apply to stereotypy. The criterion lines were applied to FAs of stereotypy, and the levels of differentiation (LoD) between the alone/no interaction conditions and each of the other conditions types (i.e., play/control, demand, and attention) were calculated. Fifteen students diagnosed with autism, between 3 and 18 years old, and who engaged in stereotypy were exposed to the following: Functional Analysis (FA); Augmented-Competing Items Assessment (A-CSA); and, Treatment Analysis (TA). The TA consisted of two condition types: 1) access to alternative sources of reinforcement; and, 2) prompting of functional/contextual engagement. The LoD analyses suggested that the maximum LoD between the FA conditions was predictive of responsiveness to treatment in the TA (R2 0.79 and R2 score up to 0.91, with an expanded model that included the max LoD between FA conditions). We discuss what type of data our visual analysis inspects and what treatments were predicted as being effective by the subtyping model and LoD analyses.



Eileen Roscoe and Lauren Rae at ABAI.



When Red Apples Are Green: Generalization by Picture Type. Research presentation by Kelsey Burren.



33 Turnpike Road Southborough, MA 01772-2108 508.481.1015 **www.necc.org**



