



# Research

Summer 2020

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



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# Familial Risk for Autism: New Research Challenges Some Old Ideas

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It has long been known that autism is a heritable disorder. However, the genetics of autism have been found to be quite complex with multiple, distinct genetic conditions. Prevalence research suggests that autism is diagnosed in over 1% of the population with the most recent CDC estimate suggesting that 1 in 54 children have autism in the United States (Maenner et al., 2020). Males are known to be 3 to 4 times more likely than females to have autism. Much effort has been made to attempt to unpack why this difference exists. One line of work on *de novo* (new in the family) mutations has suggested that it is possible that being female comes with a lower risk of developing the disorder when *de novo* mutation occurs. This implies that females require more genetic atypicality to develop autism and this led researchers to suggest that there may be a female protective effect (FPE) that accounts for the sex ratio difference. If true, this would mean that unaffected female individuals with a family history of autism may carry, and silently transmit, proportionally greater genetic liability than unaffected male family members (Christensen et al., 2018).

A recently published study (Bai et al., 2020), among other interesting results, challenges the notion of FPE. In this study, the investigators surveyed the Swedish national registers of births and family relationships for this analysis. The children's records searched were born from 2003 to 2012

and approximately 13,000 children, 1.5% of the population surveyed, were diagnosed with ASD. Children of mothers with one or more siblings with autism were about three times more likely than children in the general population to have ASD. Children of fathers with one or more siblings with ASD were twice as likely as children in the general population to have ASD, a rate that did not differ significantly than that of children whose mothers have a sibling with ASD. So, though having an aunt or uncle clearly increased the risk that a child would also have autism, there was no significant difference by gender. The authors conclude, "These findings establish a robust general estimate of ASD transmission risk for siblings of individuals affected by ASD, the first ever reported. Our findings do not suggest female protective factors as the principal mechanism underlying the male sex bias in ASD." More research is clearly warranted.

Bai, D., Marrus, N., Yip, B. H. K., Reichenberg, A., Constantino, J. N., & Sandin, S. (2020). Inherited Risk for Autism Through Maternal and Paternal Lineage. *Biological Psychiatry*.

Christensen DL, Braun KV, Baio J, et al. (2018). Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and



Developmental Disabilities Monitoring Network, 11 Sites, United States, 2012. *MMWR Surveillance Summaries*, 65(13), 1-23. DOI: <http://dx.doi.org/10.15585/mmwr.ss6513a1>

Maenner, M. J., Shaw, K. A., & Baio, J. (2020). Prevalence of autism spectrum disorder among children aged 8 years—autism and developmental disabilities monitoring network, 11 sites, United States, 2016. *MMWR Surveillance Summaries*, 69(4), 1.

# NECC Published Research on Increasing Varied Play Behavior in Children with Autism: Why is This Important and How Can We Do This Effectively?



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Children with autism (CWA) often engage in repetitive behavior including repetitive play. Invariant play can take many forms, such as children choosing to play with a specific item to the exclusion of others, playing with items in a repetitive manner with little variation, or limited sampling of various play materials. Limited play or leisure skills can prevent children from important learning opportunities, experiences, and social interactions. Few studies have assessed the prevalence of repetitive play and how it compares to the play of their typically developing peers. A notable exception is a study by Stacie Bancroft (Program Director) et al. (2016), who recently conducted a study to answer this question. This study compared variability in selection of play materials across two groups of children, aged 2 to 8 years, 30 CWA and 30 typically developing children. They measured whether the children selected the same or different play materials across selections for three activities (selecting paper outfits to dress dolls, selecting beads to place on a string, and selecting colors

for coloring shapes). Results of the study showed that CWA were more likely to exhibit repetitive selection of materials, whereas children of typical development often showed more variable selections. Interestingly, the differences observed between CWA and their typically developing peers widened across age of both groups, with CWA showing the same level of invariability and the typically developing peers showing increases in variability of play as age increased. These findings suggest that repetitive play is more prevalent among CWA than their typically developing peers, and that this lack of variable play may persist if left untreated.

Given the importance of teaching varied play skills and the need for intervention, researchers and clinicians at NECC are invested in identifying effective strategies for promoting this skill for NECC students. Cormac MacManus (ACE program specialist) et al. (2015) evaluated an intervention that involved the use of video modeling to teach three CWA play sequences with 30 vocalizations and 40 actions. During the intervention, the therapist showed the participants a 3-min video that depicted a model demonstrating how to play with the play set using a variety of motor actions and vocalizations according to a detailed

script. The only manipulation was showing the participant the video; no additional prompts or programmed consequences were provided. The video modeling intervention was conducted across three different play sets: a bank, a castle, and a mansion. As a result of the video modeling intervention, all three children with autism demonstrated mastery in depicting the motor actions and vocalizations associated with the play sequences. A noteworthy feature of this study was that MacManus et al. periodically conducted probes with novel combinations of materials (e.g., the castle playset was presented to the child with an untrained character and object). During these probes with recombined materials, the children engaged in the trained play sequences using new untrained combinations of stimuli (i.e., by combining characters and objects from one play set into the play sequence for a different play set). Additionally, all participants engaged in novel, contextually relevant motor actions and vocalizations. The implication of these findings is that video modeling can be an effective and efficient teaching strategy for increasing varied play among children with autism. In addition to the intervention

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producing increases in trained play sequences, it resulted in concomitant increases in untrained play sequence combinations (i.e., learned vocalizations and actions were demonstrated across novel combinations of play sets and materials) and untrained play behavior (i.e., vocalizations and actions).

# Research at ABAI

Staff from NECC presented papers, posters, and symposia at the 46th annual convention of the Association for Behavior Analysis International (ABAI). This year's convention was held virtually due to the ongoing Coronavirus pandemic. The following are a sample of work presented.

## MATCHING VISUAL STIMULI: DOES SIMILARITY MATTER?

Flynn, K., & Dickson, C.A.

*An important foundational skill for learning to communicate in individuals with autism is discrimination or understanding the relations between stimuli and how they are similar and different. An example of such a skill is learning to match objects to their corresponding pictures. The authors of the following presentation compared whether object-to-picture matching was acquired more quickly when photos or line drawings were used as pictures.*

### EDITOR'S NOTE:

Three young men with autism participated in this study investigating whether the form of visual stimuli affects the acquisition of object-to-picture matching. Object-to-picture matching was established with photos and line drawings, and then relations were taught between the objects and arbitrary stimuli. Subsequently, probes were conducted for the emergence of untrained relations between these arbitrary stimuli and the photos and line drawings. A parallel treatments design was used to compare performances based on photos vs. line drawings. For two participants, there was no difference in trials to mastery between photos and line drawings. For the third participant, relations were mastered more efficiently with photos than line drawings in 8/11 comparisons; both relations were mastered at the same rate in the remaining 3 comparisons. Equivalence relations emerged between arbitrary symbols and both photos and line drawings for the first two participants, but object-to-arbitrary



Kelsey Flynn (above) and Chata Dickson (below)



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## Research Selections

1. Matching visual stimuli: Does similarity matter?
2. Evaluating the paired-stimulus preference assessment for identifying social reinforcers for skill acquisition
3. A component analysis of self-monitoring for increasing task engagement
4. Examining procedural variations of delivering competing stimuli in the treatment of stereotypy
5. Evaluation and mitigation of the effects of treatment integrity failures

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symbol relations were not acquired by the third participant. The use of stimuli with greater visual similarity to the target object may yield greater efficiency in mastering object-to-picture relations for some individuals with autism. Mean interobserver agreement across all phases and participants was 99%. †

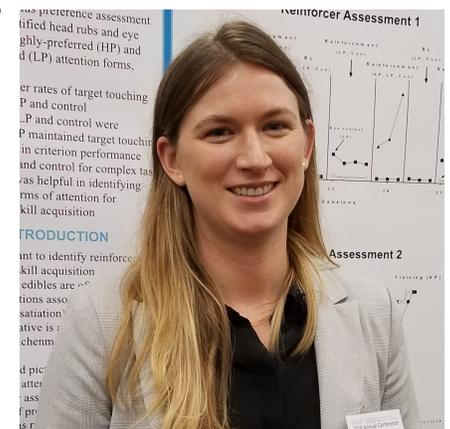
## EVALUATING THE PAIRED-STIMULUS PREFERENCE ASSESSMENT FOR IDENTIFYING SOCIAL REINFORCERS FOR SKILL ACQUISITION

Schaefer, A., & Roscoe, E.M.

### EDITOR'S NOTE:

*An important consideration when teaching skills to children with autism is the identification of stimuli that can be reinforcers (i.e., effectively increase skills). One example of a type of reinforcer is social interactions. Because preferred forms of social interaction can vary considerably across individuals with autism, it is important to conduct a systematic preference assessment to determine the type of social interaction that is most likely to be effective when delivered following behavior. In the following paper, the authors describe a study that involved conducting a preference assessment of social interaction followed by a number of skill acquisition assessments to determine if the most preferred form of social interaction was effective in increasing socially important skills.*

The purpose of this study was to replicate and extend previous research on pictorial-paired-stimulus (PS) preference assessments with social stimuli by assessing the generality of outcomes across multiple reinforcer assessments. A 16-year-old boy with autism and a 14-year-old boy with autism participated. Following implementation of the PS assessment, highly preferred (HP) and less preferred (LP) attention forms were evaluated in three subsequent reinforcer assessments. First, we conducted a concurrent-operant arrangement in a reversal design, using a simple arbitrary response (i.e., target touch). Responding was allocated to the HP relative to the LP and control options; however, responding was allocated to the LP relative to control when the HP option was no longer available. Second, we conducted a single-operant arrangement in a multiple baseline design, using a more complex arbitrary task (i.e., 8-step LEGO structures). Third, we conducted a single-operant arrangement in a multiple baseline design, using socially relevant vocational tasks (e.g., document filing) identified by caregivers in an indirect assessment. The HP reinforcers consistently resulted in the quickest acquisition across tasks, supporting the generality of the results of the PS. †



Ali Schaefer

# A COMPONENT ANALYSIS OF SELF-MONITORING FOR INCREASING TASK ENGAGEMENT

Sheets, S., & Roscoe, E.M. .

## 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 self-monitoring or teaching the individual to self-monitor and record their own behavior. In the following poster, 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 task engagement.*



Sam Sheets

Self-monitoring has been suggested to be an effective treatment procedure by previous research. Although self-monitoring has been found to be an effective approach for increasing a variety of skills such as increasing time on-task, vocational engagement, and productivity, it is often conducted with additional treatment components such as prompting and differential reinforcement of alternative behavior (DRA). Therefore, the potential benefit of self-monitoring alone remains unclear. The purpose of the current study was to conduct a component analysis of a self-monitoring intervention for increasing task engagement and productivity in a 20-year old male with autism spectrum disorder. During the treatment analysis, four treatment components were sequentially evaluated: self-monitoring alone (baseline) before and after training, self-monitoring plus DRA (accuracy), self-monitoring plus DRA (accuracy & engagement), and DRA (engagement). Dependent variables measured were task engagement, productivity, and stereotypy (Reliability was assessed in 25.5% of sessions;  $M = 98.1\%$ ). Self-monitoring alone was ineffective both after training and DRA (accuracy & engagement). By contrast, DRA (accuracy) was effective following exposure to DRA (accuracy & engagement). Therefore, self-monitoring can be effective when combined with only DRA (accuracy) under certain circumstances. The implications of these findings for using effectively using self-monitoring will be discussed. †

# EXAMINING PROCEDURAL VARIATIONS OF DELIVERING COMPETING STIMULI IN THE TREATMENT OF STEREOTYPY

Touhey, J.L., Li Volsi, C.A., & Ahearn, W.H.

## EDITOR'S NOTE:

When children exhibit challenging and interfering problem behavior, it is often a priority to assess and treat the behavior before educational programs can commence. One type of challenging problem behavior, referred to as automatically reinforced problem behavior, occurs independent of social consequences (i.e., it seems to be maintained by the sensory consequences directly produced by the response). In paper below, the author conducted a modified preference assessment that involved identifying leisure items that effectively competed with the problem behavior. During the preference assessment, the participant had access to a variety of leisure items, presented one at a time, and various treatment components (e.g., prompting and redirection) were evaluated as needed.

Rooker et al. (2018) reviewed the literature for treating automatically reinforced self-injurious behavior. They found that noncontingent reinforcement was a commonly effective procedure particularly when informed by a competing stimulus assessment. Jennett et al.



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Julia Touhey

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(2011) examined the effects of representing stimuli and response blocking on competing with engagement in SIB and suggested that both techniques could enhance treatment outcomes. The present experiment sought to examine the effects of competing stimuli on two participants' automatically reinforced stereotypy. A standard functional analysis of motor stereotypy was conducted. Next, three effective competing stimuli were identified via a competing stimulus assessment. Then two procedural variations were examined, presenting an alternative competing stimulus when item contact was absent and providing redirection to functional engagement with the stimulus. Both item contact and functional engagement with the stimulus were evaluated along with stereotypy. Interobserver agreement data were collected in at least 33% of sessions in each condition for all dependent measures and mean total agreement was above 85% for each measure. Results suggest that for one participant both procedural variations were associated with lower levels of stereotypy and higher levels of appropriate behavior, and for the other participant redirection to functional engagement was necessary to achieve desired outcomes. †



Catlyn Li Volsi

## EVALUATION AND MITIGATION OF THE EFFECTS OF TREATMENT INTEGRITY FAILURES

Courtemanche, A., & Thomason-Sassi, J.L.

### EDITOR'S NOTE:

*When conducting interventions for decreasing problem behavior, an important consideration is whether the treatment will have robust and lasting behavior change in the face of various treatment challenges. Examples of treatment challenges are inconsistent delivery of the reinforcer for appropriate behavior and inconsistently withholding the reinforcer that maintains problem behavior. In this research study, the authors evaluated strategies for increasing persistence of treatment in the face of these treatment challenges. These strategies included intermittently conducting sessions with no treatment challenges and conducting booster training sessions.*

Differential reinforcement of alternative behavior (DRA) is widely used and has been shown to be a robust and effective intervention. However, previous studies suggest that reduced treatment integrity can result in the re-emergence of challenging behavior. The current study evaluated the effects of treatment integrity failure on DRA interventions and the use of booster sessions to increase the persistence of a functional communication alternative in the context of integrity failure. Experiment 1 determined the integrity level at which detrimental effects are observed when treatment integrity errors are applied to a continuous DRA intervention. Mands decreased at integrity levels of 50% reinforcement or less for 2 of 3 participants. Experiment 2 evaluated the effect of varying ratios of interspersed full-integrity sessions among reduced-integrity sessions. A history of frequent and infrequent full-integrity sessions increased mand persistence for 2 participants. Experiment 3 evaluated the efficacy of the booster intervention on a DRA treatment faded with a multiple schedule and exposed to reduced treatment integrity. Treatment integrity data were collected in 75% of sessions and averaged 100%. Interobserver agreement data were collected in 36% of sessions and averaged 99.2%. †



Jessica Thomas-Sassi (above) and Aimee Courtmanche (below)



# Research



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