To compile this year’s ACU research report, the committee co-chair, Dr. William McMahon, Professor and Chair of the Department of Psychiatry at the University of Utah, sent queries to fellow researchers at Utah’s flagship universities: The University of Utah, Utah State University, and Brigham Young University. Seventeen different researchers were queried. A number of individuals do not have funding or an autism-related study running at this time. Some responded to the initial query but didn’t send a report. Our final response this year was more robust than last year. Moving forward, the committee plans to query researchers on a bi-annual basis and to continue to seek out new autism research at other Utah universities.

Autism Research projects at The University of Utah include:

- Promoting Independent Living for Adolescents and/or Adults with Asperger Syndrome or High Functioning Autism
- iSTAR: A strength-based approach to increase social engagement and to prepare children and youth with ASD for future employment
- Outcome of Autism in Adulthood: Follow-Up After 20 Years
- In utero Steroid Dysregulation: Environmental Mediators of Genetic Risk in Autism
- Functional Outcome Factors in Adults with Autism Spectrum Disorders
- Using parent and sibling training to deliver an internet applied behavior analytic program, Rethink Autism, to young children with autism and their families

Autism Research projects at Utah State University include:

- The Effects of Simultaneous Script-Training and Fading Procedures on the Mand Variability of Children with Autism
- The Use of Activity Schedules to Promote Social and On-task Behavior in Children with Autism During a Game of Hide and Seek
- An Evaluation of an Online Training Module to Train Instructors to Implement Discrete Trials

Autism Research projects at Brigham Young University include:

- Using Robotics to Increase Social Engagement in Children with ASD
Institution: University of Utah

Principal Investigator: Louise Dunn, ScD, OTR/L (Occupational Therapy)

Co-Investigators: Megan Farley, Ph.D.

Study title: Promoting Independent Living for Adolescents and/or Adults with Asperger Syndrome or High Functioning Autism

Funding source: currently seeking funding

Specific Aim 1: To implement an evidence-based cognitive and behavioral model of intervention to increase daily living skills for adolescents and young adults with HFA/AS who have adaptive skill deficits measured at 1.5 SD below their IQ scores (including the daily living skills subscale).

Specific Aim 2: To evaluate the success of the intervention immediately post-implementation and after 3 and 6 months, assessing target skills maintenance and generalization of strategy use.

Specific Aim 3: To obtain caregiver/significant other and participant evaluations of the treatment.

Specific Aim 4: To identify cognitive and behavioral strategies used in skill development for further development of this multicomponent intervention for this population.

Benefits of participation in this study for families and their youth and young adults with HFA/AS are increased independence with self-selected daily living goals. These outcomes address a need identified in research and prepare these youth for future living in the community. Preliminary findings show that the youth and their parents reported increased performance and satisfaction with their selected goals related to personal care, physical activity, personal care and home management.

Are you currently recruiting study participants? Please check Yes or No: ☐ Yes  ☐ No

Contact information:

Louise Dunn, Principal Investigator, by voicemail @ 801-585-9356
or by email @ louise.dunn@hsc.utah.edu
Institution: University of Utah

Principal Investigator: Cheryl Wright, Ph.D. (Family and Consumer Studies)

Co-Investigators: Marissa Diener, Ph.D., Louise Dunn, ScD, OTR/L, Scott Wright, Ph.D.

Study title: iSTAR: A strength-based approach to increase social engagement and to prepare children and youth with ASD for future employment

Funding source: Currently seeking funding

Study Aim #1: To increase social engagement with family members and peers for high functioning children with ASD through use of strengths and interests in graphic programs (SketchUp™)

Study Aim #2: Increase skill with engaging and working collaboratively with others on graphic projects

Study Aim #3 Increase skills with graphic program design and storyboards

iSTAR is an interdisciplinary project using SketchUp™ (part of Project Spectrum sponsored by Google) to promote exploration and development of skills for future jobs. Our original intent was to respond to parental input for a program to teach children with Asperger’s syndrome and high functioning autism computer skills for future jobs. However, during the program and at the end of the program we learned through our focus group discussions, observations, and videotaped observations that authentic friendships, enhanced peer status, and a sense of hope were outcomes/themes we observed and that our parents commented on most often. We continue to expand our research efforts to develop further computer skills through a badge system. In addition, we continue to utilize peer and expert mentoring to promote social engagement with peers, other children with ASD, and with family members.

The study website:  istar.utah.edu.
Institution: University of Utah

Principal Investigator: William R. Jenson, Ph.D. (Educational Psychology)

Co-Investigators: Taryn Springer

Study title: Using parent and sibling training to deliver an internet applied behavior analytic program, Rethink Autism, to young children with autism and their families

Funding source: University of Utah-Development Money, Donated programming from Rethink Autism

The aim of this study is to use the web based Rethink Autism program to deliver quality, cost effective applied behavior analytic programming to young children with autism. This is a dissertation, pilot, study that will recruit six families with mothers and older siblings to be trained in delivering a quality ABA programming to an ASD child in their family. The intervention will utilize a weekly group training session with follow-up Skype family consultation in implementing an individually designed Rethink ABA program. Implementation of this research study is scheduled for late summer to the fall of 2012.
Institution: University of Utah

Principal Investigator: William McMahon, M.D. (Psychiatry)

Co-Investigators: Megan Farley, Ph.D., Deborah Bilder, M.D., Hilary Coon, Ph.D., Eric Fombonne, M.D. (McGill University)

Study title: Outcome of Autism in Adulthood: Follow-Up After 20 Years

Funding source: Autism Speaks

To understand adult outcomes of autism, we are conducting a 3-year project led by Drs. Bill McMahon, Megan Farley, Deborah Bilder, and Hilary Coon at the University of Utah and Dr. Eric Fombonne at McGill University. The study includes an extensive clinical and functional assessment of an epidemiologic sample of individuals first assessed 20 years ago in the UCLA-University of Utah Autism Studies. This project aims are to (1) understand all aspects of current function of nearly 400 individuals, including their symptoms of autism, associated features, cognitive status, and co-occurring medical conditions; (2) to inventory current functional deficits and service use; and (3) to examine relationships between childhood and current features, to identify possible developmental subtypes of autism. Over 180 families have participated to date.
Institution: University of Utah

Principal Investigator: Deborah Bilder, M.D. (Psychiatry)

Co-Investigators: Megan Farley, Ph.D., Hilary Coon, Ph.D., Beth Botts, M.D., Ken Smith, Ph.D., Richard Pimentel, Joseph Viskochil, William McMahon, M.D.


Funding source: Autism Speaks

This study is a component of Megan Farley and Bill McMahon’s Adult Outcomes Study. This component focuses on excessive rates of death and causes of death in individuals with autism spectrum disorders originally identified in Utah in the mid-1980’s. Its results may impact the medical care and preventative health maintenance to improve the long-term health, functioning, and quality of life of adults with autism spectrum disorders.

Institution: University of Utah

Principal Investigator: Deborah Bilder, M.D. (Psychiatry)

Co-Investigators: Megan Farley, Ph.D., Hilary Coon, Ph.D., William McMahon, M.D.

Study title: Psychiatric and Medical Comorbidity in Adults with Autism Spectrum Disorders: A Follow up of the 1980s Utah/UCLA Autism Epidemiologic Study

Funding source: Autism Speaks

This study is also a component of Megan Farley and Bill McMahon’s Adult Outcomes Study. This component focuses on the presence of medical and psychiatric disorders among adults with autism spectrum disorders originally identified in Utah in the mid-1980’s. Commonly, these disorders adversely impact behavior and quality of life among adults with ASD. It is therefore
important to understand the frequency and presentation of these disorders in this population to improve their identification and treatment.

**Institution:** University of Utah

**Principal Investigator:** Deborah Bilder, M.D. (Psychiatry)

**Co-Investigators:** Hilary Coon, Ph.D., Amanda Bakian, Ph.D., Judith Pinborough-Zimmerman, Ph.D., William McMahon, M.D.

**Study title:** In utero Steroid Dysregulation: Environmental Mediators of Genetic Risk in Autism

**Funding source:** None

This study is a component of two separate Utah autism studies: 1) Hilary Coon and Bill McMahon’s Autism Genetics Project and 2) Judy Zimmerman’s Utah Registry for Autism and Developmental Disabilities. This study focuses on exploring the association between child ASD case status and maternal risk factors for in utero steroid dysregulation in a population-based sample and a research-based sample. If this association is found, we will identify additional ASD associations in the research-based sample, potentially pursuing target genes in those participants which appear to have heightened vulnerability. The long-term goal of this study is to identify a prenatal risk factor for autism that can be successfully modified to reduce recurrence risk of ASD in genetically vulnerable families.
Researchers at the University of Utah are continuing a 2-year study to examine the transition between adolescence and adulthood in autism spectrum disorders, with the aim of understanding what developmental and environmental factors contribute to or interfere with a successful transition. This funding will also enable us to add more adults to our adult study population, thereby increasing the sample’s power for statistical analyses of autism subtype. Adding additional participants to our sample of adults will also enhance the sample’s representativeness of the current diagnostic picture of autism spectrum disorders in youth, as increasing numbers of children with average-range intellectual abilities are being identified today.

Are you currently recruiting study participants? Please check Yes or No:  X Yes   ☐ No

Yes, but limited to people who have participated in our previous studies.
Institution: University of Utah

Principal Investigator: Hilary Coon, Ph.D. (Psychiatry)

Funding source: NIH

Summary of genetics research

1) An NIH-funded collaborative genetic study of extended families is slated to being in the next few months. This study will be done in collaboration with the University of Pennsylvania, the University of Washington, and other national and international collaborators who are part of the Autism Genome Project. Our aims are to use the unique, large, high-risk families identified here in Utah and additional large families in Washington to look for genetic variation that contributes to ASD and related traits. Extended families offer an excellent opportunity to identify and study genetic variation, and complement many ongoing studies focusing on cases or small families. We have already found evidence suggesting shared genetic variation contributes to ASD and other traits in the extended Utah families. New molecular techniques will allow us to generate very detailed genetic sequence data, resulting in highly accurate and extensive genetic information. We also can use new software approaches to study the data and pinpoint particular DNA variation contributing to risk.

2) In preparation for this study, we have already shipped 528 DNA samples from extended high-risk families to the University of Pennsylvania to be genotyped with a newly introduced genotyping technology called the exome chip. This product will allow us to begin searching for risk mutations in these families.

3) We continue to collaborate with national and international collaborators in the Autism Genome Project. One current focus of this group is a specific type of genetic mutation that involves either a deletion or a duplication of DNA. We are participating in the discovery and characterization of these mutations, and then in determining how these mutations might affect the wide variation of behavior in ASD.

4) We are starting new pilot studies in collaboration with Dr. Robert Fujinami in the Department of Pathology to study alterations in neural function in ASD. These studies rely on new technology whereby peripheral cells from a routine blood draw can be altered to form induced pluripotent stem cells (iPS cells), which can then be differentiated to form neurons. We propose to study differences in these cells derived from persons with ASD to cells derived from matched typically developing individuals. The natural differences in these cells can be studied, in addition to their reaction to outside stimuli.

We investigated the effectiveness of supplementing script training without script fading with a number of strategies to promote generalization on the spontaneous and generalized use of complex language targets of a child with autism. Specifically we were interested in knowing if combining script training and generalization procedures during the acquisition phases enhance the transfer of stimulus control and promote the spontaneous and generalized use of language skills and if stimulus control could be transferred from scripts to more naturally-occurring stimuli in the absence of formal script fading. Extrapolating from previous research, we carefully arranged our teaching procedures to include the following generalization-enhancing tactics: a) natural contingencies of reinforcement, b) training multiple exemplars, c) training loosely, and d) programming common stimuli (Stokes & Baer, 1977). We found that these procedures were effective in promoting generalized, spontaneous language.


The identification of preferred items and activities is vital to successful behavior intervention programs for children with developmental disabilities. Preference assessments effectively identify items and activities that may serve as reinforcers for individuals with limited communication repertoires. In a preference assessment, the individual makes a selection from an array of available items. Typically, the individual is either presented with the actual item or a photograph of the item. Most research on preference assessments has been limited to the evaluation of food or toy preferences. Different kinds of attention, such as tickles, hugs, spins, or singing a song, may be strong reinforcers for children with autism. It is challenging to assess preference for these kinds of reinforcers because they do not have a tangible item that can be presented to the individual. The purpose of the study is to evaluate the effectiveness of using short video clips to represent social interactions in a preference assessment for children with autism. Video clips, which depict movement and sound, may accurately represent social interactions so that these types of potential reinforcers can be assessed.
Pollard, J.S., Betz, A.M., & Higbee, T.S. (in press). Script-fading to promote unscripted bids for joint attention in children with autism. *Journal of Applied Behavior Analysis.* We evaluated the effects of script-fading procedure to teach three children diagnosed with autism to initiate bids for joint attention, and investigated variables that influence unscripted responding. Specifically, we examined the extent that (a) script training alone, (b) varied adult statements, and (c) multiple exemplar script training would have on promoting unscripted bids for joint attention. Our results indicate that all three participants learned to initiate bids for joint attention and the response generalized to untrained stimuli, conversation partners, and the natural environment. Furthermore, unscripted language when initiating bids for joint attention increased for all participants.

Groskreutz, N. C., Groskreutz, M. P., & Higbee, T. S. (2011). Effects of varied levels of treatment integrity on appropriate toy manipulation in children with autism. *Research in Autism Spectrum Disorders,* 5, 1358-1369. We investigated the effects of systematically varying levels of treatment integrity during a prompting procedure to promote play in young children with autism. We found, generally, that the effectiveness of the intervention corresponded to the fidelity with which it was implemented.

**Studies Currently Underway at ASSERT:**

**The Effects of Simultaneous Script-Training and Fading Procedures on the Mand Variability of Children with Autism.**

Kristen N. Kelley & Thomas S. Higbee

This goal of this study is to increase the variability demonstrated in requests (mands) by individuals with autism. We will use scripts and script fading to teach new requests and procedures to elicit variability. This research will increase the research on response variability as well as attempt to produce a method for increasing response variability for children.

**The Use of Activity Schedules to Promote Social and On-task Behavior in Children with Autism During a Game of Hide and Seek**

Matthew T. Brodhead, Thomas S. Higbee, Joy S. Pollard, and Jessica S. Akers

This study examines whether or not activity schedules can promote social interactions and maintain on-task during a game of hide and seek in children with autism. An activity schedule contains a series of visual and textual cues that signal responses for the participant to engage in. Using a non-concurrent multiple baseline design across dyads (groups of two students) design, social interactions and on-task behavior did not occur during baseline conditions. A schedule probe followed, which included the introduction of each participant’s activity schedule to test...
and see if the schedule itself, prior to teaching, would improve social behavior. After a schedule probe, teaching sessions were introduced and performance improved and all teaching prompts were faded. Once stable responding was reached for both participants, a series of re-sequencing and generalization phases were introduced to demonstrate experimental control of the activity schedule and to test the effects of the schedule on social interactions in novel environments. This study extends the research on activity schedules by expanding the utility of activity schedules to include peer-peer social interactions in play settings that utilize the immediate, natural environment.

An Evaluation of an Online Training Module to Train Instructors to Implement Discrete Trials

Joy S. Pollard, Thomas S. Higbee, & Matthew T. Brodhead

While ABA-based interventions have been consistently shown to produce positive outcomes in young children with autism, in many locations, there are not a sufficient number of trained practitioners to provide these techniques. Because of this shortage of expertise, it is important for researchers to develop new methods of training practitioners who will work with children with autism. Thus far, researchers have investigated three primary strategies for improving the ABA-based instructional skills of practitioners: written self-instruction manuals that are self-paced and provide content, examples, and quizzes for trainees to complete (Fazzio, Martin, Arnal & Yu, 2009); video modeling, in which trainers depict the proper use of a technique in videotaped examples (Catania, Almeida, Liu-Constant and Reed, 2009); and finally, online interactive instruction, a technique that combines the most promising features of self-instruction manuals and video modeling. With online interactive instruction, participants complete learning modules on a computer where content is presented, appropriate implementation of techniques is modeled via video, and quizzes are completed to evaluate acquisition of content knowledge. To date, only one group design study has been completed on the use of online interactive instruction (Granpeesheh et al., 2010). While participants in this study showed improvement on content knowledge scores as measured by interactive quizzes, their use of ABA-based techniques with actual children with autism was not measured. Given that the limited research generated on this technique has been generally favorable and due to its potential for facilitating widespread dissemination of evidence-based treatments, additional empirical study seems warranted. Thus, the focus of this project will be to pilot an online interactive instructional program to train professionals to effectively use ABA-based techniques with children with autism.
**Institution:** Brigham Young University

**Principal Investigator:** Bonnie Brinton, Ph.D. (Communication Disorders)

**Co-Investigators:** Mark Colton, Ph.D., Martin Fujiki, Ph.D., Michael Goodrich, Ph.D., Lee Robinson, M.S., CCC-SLP

**Study title:** Using Robotics to Increase Social Engagement in Children with ASD

**Funding source:** Brigham Young University, Honda Research Institute

A number of investigators have reported success in using robots to increase social engagement in children with ASD (Dautenhahn & Billard, 2002; Duquette, Michaud, & Mercier, 2007; Feil-Safer & Mataric, 2009; Kozima, Nakagawa, & Yasuda, 2005). There has been little evidence, however, that the engagement children with ASD establish with robots will generalize to interaction with people when the robot is not present. In 2010 we initiated a pilot project to investigate the efficacy of integrating a robot (on a low-dose basis) into a treatment program for two children with ASD. Both children rarely established joint attention in interaction and demonstrated frequent repetitive and stereotypic behaviors. In this project, the children received their regular intervention plus a 10 min. segment (of each 50 min. session) in which they interacted with a robot. During this time the clinician, child, parent, and robot participated in a series of reciprocal activities. The activities highlighted affective aspects of reciprocal interaction. Following treatment, one child showed dramatic increases in initiating and responding to social engagement with human interactional partners. The other child produced more varied gains, but also showed increases in initiating and responding to social engagement. Encouraged by these results, we have initiated a larger study with four children with ADS participating in a multiple baseline single subject design.

The study website: https://facwiki.cs.byu.edu/AR/index.php/Main_Page
Institution: Brigham Young University

Principal Investigator: Janet E. Lainhart, M.D. (Psychiatry)
Utah Autism Research Program, University of Utah

Co-Investigators: Erin D. Bigler, Ph.D.

Study title: A Longitudinal Neuroimaging Study of the Brain in Children and Adults with Autism: The Neurobiological Basis of Variation in Intelligence in Autism and Quantifying White Matter Connectivity in Autism.

Funding source: NIH Grant

Longitudinal neuroimaging of autism: Our goals in this study are to analyze and describe developmental morphometric and functional brain abnormalities, particularly those involving the temporal, frontal, and parietal lobes, the corpus callosum, thalamus, and limbic system, that are specific to idiopathic autism and will help elucidate neurodevelopmental mechanisms and other factors involved in the disorder.

Dr. Bigler’s website: http://psychology.byu.edu/Pages/Faculty%20and%20Staff/Bios/ErinBigler.aspx