

## Interdisciplinary Research (IDR) Origination Awards

*From Big Data to Big Impact: Improving Risk Prediction  
for Suicidal Thoughts and Behaviors in College-Age Young Adults*

Role	Investigators	Department	College
PI	Terisa Gabrielsen	Counseling Psychology & Special Education	Education
PI	Mikle South	Psychology	FHSS
Co-PI	Shannon Neeley Tass	Statistics	CPMS
Co-PI	Michael Barnes	Public Health	Life Sciences
Co-PI	Jon Cox	Counseling and Psychological Services	(Student Life)
Co-PI	Carl Hanson	Public Health	Life Sciences
Co-PI	Rebecca Lundwall	Psychology	FHSS
Co-PI	Jared Nielsen	Psychology	FHSS
Co-PI	Quinn Snell	Computer Science	CPMS

*\*Consultants include Melissa Heath (Education) and Sarah Coyne (Family Life)*

### Abstract

Suicide is increasing at alarming rates nationwide. It is the second leading cause of death (after traffic accidents) for college students and college counseling centers everywhere are struggling to meet a rapid rise in demand for their services. However, research regarding risk factors for suicide has tended to use narrow methods and a narrow swath of ideas, and 50 years of study in this area has not produced reliable predictors of individual suicidal thoughts and behaviors. A call has been issued to shift away from these approaches to the use of machine learning-based “risk algorithms” as a standard for evidence-based health care. We propose to use machine learning algorithms with very large datasets of variables that align well with the National Institute of Mental Health Research Domain Criteria (RDoc) matrix, in order to define better predictive models for suicidal thoughts and behavior in college students. We will utilize machine learning to interrogate two types of data: a) longitudinal datasets from college counseling centers nationwide (with an estimated 1 million clients over the past 8+ years); and b) an intensive, cutting-edge “ecological momentary analysis” approach to study young adults with significant levels of social isolation who are at very high risk for suicide. Three related important aims include modelling of dynamic changes in suicide risk across the past decade, modelling possible gender differences that could help understand the especially large increase in women completing suicide, and modelling the contribution of extreme social isolation to suicide risk. With this information, clinicians, university staff, and the public may better recognize environmental risks and other behavioral warning signs for suicide risk in college students and other young adults. If successful, we aim to extend the research plan downwards to include school-age children and adolescents.

### Summary of Options for External Funding List (See descriptions under External Funding Section)

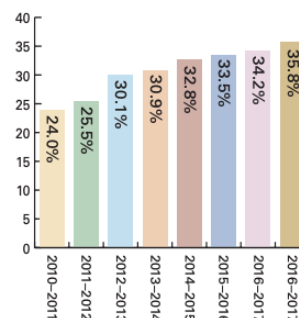
NIH R01 PAR-18-929: High-Priority Areas for Research Leveraging Electronic Health Records and Large-Scale Data - <b>5 years</b>	\$250,000/ year	Application November, 2020
Robert Wood Johnson Foundation's Health Data for Action - <b>1 year</b>	\$150,000	Application September, 2019
SAMHSA Garrett Lee Smith (GLS) Campus Suicide Prevention - <b>3 years</b>	\$102,000/ year	Next round expected March 2020
HRSA 19-090 Autism secondary data analysis research using national datasets – <b>1 year</b>	\$100,000	Application January, 2020

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### Statement of Problem

The Centers for Disease Control (CDC) reports that suicide rates nationwide have increased steadily over the past two decades, including a 47% increase in Utah during that time<sup>1,2</sup>. The annual rate of increase in the U.S. has doubled since 2006 and shows no signs of slowing. College students are especially affected by suicide: it is the second leading cause of death (after traffic accidents) for this group, cutting short many promising lives<sup>3-5</sup>. College and university counseling centers nationwide are seeing an average 30% to 40% rise in service utilization, primarily driven by an increase in students seeking help for “threat-to-self” concerns.<sup>6</sup>

**Seriously considered  
attempting suicide**



*Figure 1. Increase in serious suicidal thoughts among college students visiting their counseling center. From CCMH 2018 Annual Report.*

Despite the urgency of this growing public health problem, the mechanisms that underlie risk for suicide are poorly understood. A recent meta-analysis of 365 longitudinal, predictive studies for suicidal thoughts or behavior (STB) found that prediction for all outcomes was only slightly better than chance, and that predictive power has not increased over the past 50 years of research.<sup>7,8</sup> The authors of this meta-analysis highlight two key limitations to most existing research that constrain the utility of findings. First is the homogeneity of variables studied and the narrow methods used to study them; essentially, predictive power has not improved because researchers keep doing the same thing over and over again. Second is that studies rarely examine multiple risk factors together. The authors **strongly recommend what they call “a shift in focus from risk factors to machine learning-based risk algorithms.”**

### Project Aims

Our primary aim is to use machine learning and related statistical approaches for analyzing “big data” to **develop risk algorithms which can predict increased or decreased probability for suicidal thoughts and behaviors on an individualized basis.** The intended outcome is to **facilitate targeted, timely and more individualized prevention efforts by counselors and other staff to prevent suicide among college students.**

We will focus on three specific questions arising from this aim:

*1) How well can these algorithms predict longitudinal changes in students’ STB over time?*

We will be able to analyze patterns of risk over the past decade to identify possible changes in risk factors and to update models for risk up to the present cohort of students. Can we track the increase in suicidality and improve prediction models for the most current generation of students?

*2) How well can these algorithms predict gender differences in risk for STB and for suicide completion?*

One especially concerning trend in the CDC data is that, while males have historically had higher rates of completed suicides than females, this gap is closing: the 15-year increase in suicide rate is 45% for females compared to 16% for males<sup>9</sup>. We aim to model these differences in trajectory and discover the clusters of risk factors that underlie the differences.

3) *How well can in-depth characterization of extreme social isolation improve power for predicting STB?* Autistic people complete suicide at rates up to 8 times higher than non-autistic people<sup>10,11</sup>. In particular, autistic women are at high risk for suicide completion<sup>12</sup>. However, data from our ongoing AutismConnect study show that **variables related to social ability and social discomfort are significantly correlated with suicide risk independent of autism diagnosis**, suggesting that social skills difficulties may add a general, critical risk for suicide.<sup>13,14</sup>

### Research Approach

As summarized in Figure 2, our project will simultaneously explore two branches of data. Both will be interrogated with data mining techniques that rely on minimal pre-determined assumptions.

Branch	Aims	Analysis Plan	Outcomes
<b>High-risk students.</b> <b>Longitudinal College Counseling Centers</b> <i>CCMH (national) and CAPS (BYU)</i>	<ul style="list-style-type: none"> <li>To investigate records from one million+ high-risk adults (CCC) for clusters of factors that predict STB</li> <li>To characterize individual &amp; group change over time</li> </ul>	<ul style="list-style-type: none"> <li>Machine learning to discover clusters of specific risk factors across <i>groups</i></li> <li>Regression-based analyses of <i>longterm</i> change over time</li> </ul>	<ul style="list-style-type: none"> <li>Increased predictive utility for STB in students</li> <li>Identify dynamic change in risk factors for cohorts and for individuals</li> <li>Specify contributions of gender and of social isolation to STB risk</li> <li>Individualized algorithms for clusters of high-risk young adults</li> </ul>
<b>Very high-risk young adults.</b> <b>Daily intensive tracking</b> <i>Physical activity, sleep, emotional reactivity, &amp; social media mining</i>	<ul style="list-style-type: none"> <li>To capitalize on rich data related to fluctuations in individual risk for STB</li> <li>To describe social media content &amp; use associated with fluctuations in STB</li> </ul>	<ul style="list-style-type: none"> <li>Machine learning to discover clusters of specific risk factors in <i>individuals</i></li> <li>Regression-based analyses of <i>intensive</i> change over time</li> </ul>	

Figure 2. Study overview. STB= suicidal thoughts and behaviors

1. The first branch includes two large datasets from university and college counseling centers which include information from more than a million clients over the course of 8+ years, with multiple treatment sessions for many of those clients. The Centers for Collegiate Mental Health (CCMH) database contains standardized information from more than 100 college counseling centers, with 120 variables related to client demographics (such as gender, race, financial status, living arrangements, relationship status, religious identity); client-reported mental and emotional concerns (such as depression, anxiety, eating concerns, academic distress, family distress, gender identity, history of suicidality and attempts); therapist ratings of client severity; and client previous experience (e.g., trauma, sexual assault, military service). The BYU Counseling and Psychological Services center (CAPS) is part of the CCMH database but their database adds additional years of data and additional variables from the *Outcome Questionnaire* that is completed by the client before each session, which includes a specific question about current suicidality that can be tracked over time.
2. The second branch will utilize an *ecological momentary assessment* (EMA) approach that combines wearable devices, daily electronic self-reports, and data mining of individual social media feeds to capture extensive streams of physiological and psychological data in a short amount of time (8 weeks) for 75 socially-isolated young adults at very high risk for STB. This group includes adults diagnosed with autism spectrum disorder and non-autistic adults with clinically significant social anxiety. The Illumivu measurement system utilizes wearable trackers and personal smartphones to track sleep patterns and physical activity, and also includes text prompts for daily journaling on



Figure 2. GENEActive tracker for use with Illumivu digital assessment system.

specific questions of experience, mood, and suicidality. Self-report questionnaires will include standard variables of living status and relationship status alongside self-reported loneliness and social support, and we will add self-report measures of social motivation and skill from autism symptom measures. We will ask each participant for access to their social media feeds which can be fed into machine learning algorithms to identify patterns of content and usage which are associated with our suicidality measures. **We believe that the sum of these variables will provide the most comprehensive overview of possible contributors to STB that has ever been recorded.**

*Data mining and analysis.* There are existing algorithms which have been adapted to effectively identify those with mental health from data available on social media platforms<sup>15-18</sup>. We will expand this approach and **'train' such algorithms to swath through many subtle clues rather than just a few indicative phrases, then extend these approaches to our larger datasets.** We will use receiver operating characteristic (ROC) curves to detect the sensitivity of the model for balancing between false negatives and false positives. As suggested by Coppersmith,<sup>19</sup> these multiple data sources will be developed around data models that are optimized toward trait-level risk for suicide (risk over a long period of time) over state-level information that is related to short periods of risk.

For both the counseling center and daily tracking measures, we will input variables related to suicidal thoughts and behaviors as the target while all other variables (e.g., demographic data, presenting problems, therapist ratings, client experience, and changes over time) will be used as predictor variables in classification models. When choosing the appropriate statistical or machine learning models, there is always a trade-off between predictive power and interpretability. We need the models to be interpretable so that we can understand what variables are most predictive of suicidality. Generally, regression models (linear or logistic) lend themselves to more interpretability than other classification methods such as support vector machines (SVMs) or tree-based methods (such as random forests). However, we will look at a variety of classification algorithms to determine what variables can best predict thoughts and feelings of suicide.

### **Project Members and Responsibilities**

For the past several years, team members have been working separately (and largely ignorant of each other) on various aspects of this project: studies related to data mining approaches for predicting suicide from social media feeds,<sup>16,18</sup> probing national college counseling center data to predict treatment outcome,<sup>20</sup> and characterizing mental health and suicide risk for socially-isolated women. Jared Nielsen, a new faculty member in psychology, discovered the connections and brought us together. This IDR project coalesces these separate teams around a shared vision to use our combined expertise for understanding the nature of rising suicide in college students in order to guide more effective prevention and intervention. The team is composed of faculty members from six departments across five colleges at BYU.

- Terisa Gabrielsen, McKay School: Counseling and Special Education, and Mikle South, FHSS: Psychology, are licensed psychologists with a combined 30+ years of experience in autism and mental health, with additional expertise in dissemination (Gabrielsen) and measurement of emotion (South). Dr. South is also an adviser to the *Special Interest Group on Autism, Mental Health, and Suicide* for the International Society for Autism Research. As Principal Investigators, Drs. Gabrielsen and South will coordinate all aspects of the study and are also responsible for ascertainment of participants, diagnosis and other clinical contact, and response to any situations of imminent risk for suicide.
- Shannon Neeley Tass, CPMS: Statistics, does research in biostatistics and statistical applications in medicine. She has substantial experience with accessing, organizing, and analyzing the CCMH and CAPS databases<sup>20</sup> and is expert in big-data approaches to health concerns.

- Jon Cox, Student Life: CAPS, is a licensed psychologist who sees many college students with suicidal concerns, is expert in treatment of autistic adults, and is primary point of access for the counseling center databases. Drs. Neeley Tass and Cox are responsible for database access and management.
- Michael Barnes, Life Sciences: Public Health, works in health communication and social media. Carl Hanson, Life Sciences: Public Health, does research in computational health science and health communication through social and new media. Quinn Snell, CPMS: Computer Science, works in bioinformatics and computational sciences. Together this team has published several papers related to machine approaches to detect suicide risk in social media feeds<sup>16,18</sup> that will be significantly expanded for this project. They are responsible for data mining operations and along with Dr. Neeley Tass for data analysis and algorithm development.
- Rebecca Lundwall, FHSS: Psychology, has expertise in developmental and longitudinal data analysis. She will oversee analyses of change at group and individual levels and also generalization to other age groups. Jared Nielsen, FHSS: Psychology, utilized *ecological momentary assessment* tools during his post-doc at Harvard School of Medicine, and will direct digital data collection and processing using a “precision medicine” framework that seeks to identify clusters or profiles of risk that can generalize to different individuals. Together Drs. Lundwall and Nielsen along with Dr. South will be responsible for the intensive daily tracking branch and along with Dr. Gabrielsen for preparation of the downward extension to school-age youth.

### **Inspired Experiential Learning**

An essential component of our research is training both graduate and undergraduate students to conduct high-quality and impactful research as preparation for future success. This project will include weekly team meetings and a monthly project meeting, and encourage student involvement in all phases of the work including grant writing. In addition to budgeted mentoring funds for 2 graduate students and 3 undergraduate students for the duration of the project, we expect to apply for other mentoring funds to support more student involvement throughout.

### **Expected Project Outcomes**

The key outcome to this project is the discovery of novel, data-driven algorithms that more effectively predict risk for suicidal thoughts and behaviors in college students and other young adults. The project is scientifically rigorous and very timely from a public health and policy perspective. Immediate benefits of the IDR funding include:

1. New, data-driven theoretical models suitable for application to other datasets and to other samples. We will seek funding to continue with college-age young adults and propose a downward extension to secondary school ages, where suicide is of equally great concern and more funding is available.
2. Extended methods for identifying suicide risk. If sleep dysfunction is predictive of STB as we expect, we will propose additional studies of sleep and suicide risk using a combined EEG +fMRI +tracker methodology being pioneered by other BYU psychology colleagues.
3. Having the necessary resources on hand (especially the digital tracking devices) will give us a great head start for grant application. Not only will we already have the needed devices, we will have extensive pilot data that demonstrates their value and our ability to utilize them effectively.

Of critical importance, our approach to data mining and analysis is well-matched to the National Institute of Mental Health’s “Research Domain Criteria” (RDoC) matrix.<sup>21</sup> The RDoC organizes units of analysis in more discrete and connected themes than traditional diagnostic systems. Using this approach sets us up perfectly for funding applications that prefer RDoC-based strategies.<sup>22</sup>

The multidisciplinary nature of the project will prepare us for funding applications in a number of areas as outlined in the Plans for External Funding. This includes several opportunities for basic science and data science related to mental health and suicide. Importantly, basic research is only useful as it applies to everyday life: for example, helping clinicians and education personnel to identify risk and intervene more effectively. Thus, we will also apply for funding to support implementation studies.

Dissemination of key findings to scientists as well as to university and mental health personnel and policy makers is essential. This includes a breadth of activities such as

- Publication in public health, psychology, psychiatry, and education journals. Strong summary results will be submitted to a high-impact general journal with broad visibility such as the *American Journal of Psychiatry* or the *Journal of Consulting and Clinical Psychology*. Relevant pieces of the project will be submitted to specialty journals in Public Health (e.g., *The American Journal of Public Health*), counseling (*Journal of Counseling Psychology*), and autism journals (which have active calls for research on suicide risk factors and on college students with autism).
- Conference presentations (e.g., the annual conference of the Association for University and College Counseling Center Outreach), and relevant education and public health conferences.
- Organizing workshops with research and policy personnel, and for the public and the press. We envision such a conference in coordination with the new full-time research coordinator hired by the Utah Medical Examiner's office.
- Social media presence including a website that maintains updates on key findings and treatment and policy recommendations.

**Project Timeline (see External Funding for application timeline, identified as Year 1, 2, 3)**

Year	Q1	Q2	Q3	Q4
2019 Year 1		IRB, database applications, training, recruiting	Counseling center databases cleaning & organizing, data collection for ~15 EMA participants	Machine learning algorithm building & programming for databases, ~15 EMA participants
2020 Year 2	Complete machine learning and regression analyses for databases, ~15 EMA participants	Machine learning algorithm building & programming for EMA data, ~15 EMA participants	Finish EMA data collection, complete machine learning and regression analyses for EMA data.	Explore unified models from both branches and fit to existing theories (Aim 3)
2021 Year 3	Write summary report for high-impact journal. Write project report. Organize dissemination workshops.			

Note. EMA = ecological momentary assessment (intensive daily tracking)

**Impact statement**

The *New York Times* has called suicide “an intractable public health crisis that has been unfolding in slow motion for a generation.”<sup>23</sup> Suicide is a leading cause of death for college students and rates continue to rise. In part because of piecemeal strategies and narrow conceptual models, five decades of research on risk for suicide has yielded few actionable findings. This project answers the call for big data approaches that can offer novel prediction algorithms which appreciate the complexity of factors that contribute to suicidality and suicide completion.<sup>7,8,22</sup> Outcomes from the project will ultimately lead to improved, specific prevention strategies for individuals and targeted recommendations for public policy.

### Budget and Narrative

Student Wages	Graduate students (2)		
	PhD student project coordinator (15hrs x 40wks x 2yrs x \$20/hr)	\$24,000	\$64,800
	Masters' research associate (15hrs x 40wks x 2yrs x \$18/hr)	\$21,600	
	Undergraduate students (3) (10hrs x 40wks x 2 yrs x \$12/hr)	\$19,200	
Training	ADOS research reliability training for PhD student	\$3,800	\$3,800
Supplies	Research materials, test kits & protocols	\$2,615	\$6,215
	Open access publication fees (2 publications @ \$1800)	\$3,600	
Equipment	Tracking equipment (20) and chargers (2) @\$220 each	\$4,840	\$18,840
	Illumiv software license (1 year)	\$12,000	
	Laptop for uploading tracking data and managing all project data	\$2,000	
Participant Payments	Participant payments 75 x \$275 for total study visits	\$4,500	\$25,125
	Participant travel for intensive study visits 45 x 4 visits @ \$25	\$20,625	
Travel	Conference registration for 3 conferences @\$400	\$1,200	\$1,200
<b>2-year Total</b>		<b>\$119,980</b>	<b>\$119,980</b>

**Students:** Doctoral student project coordinator—Clinical or Counseling Psychology, supervised by PIs  
Master's student statistical research associate—supervised by data mining team (Hanson, Barnes, Snell, Neeley Tass)

Undergraduate RAs for study logistics and assessment – supervised by Lundwall, Nielsen and PIs

**Supplies:** For assessment of autism vs. other socially isolating conditions in all participants – 1 ADOS-2 kit for research only @ \$2,195; test protocols for adults (ADOS-2, Module 4) x 70 @ \$6 each.

**Training:** ADOS-2 Research reliability training is remarkable opportunity for PhD student to learn a very marketable skill and allows Drs. South and Gabrielsen to attend to broader aspects of project. Nearest training is provided in San Francisco in July of each year; registration fee includes follow-up until reliability standards met, cost = \$2700 + travel.

**Equipment:** Intensive in-person assessment includes biometric sensor devices (GENEActive tracker) to be worn by up to 75 participants for extended periods, requiring periodic recharging. The trackers interface with Illumiv software to download and analyze individual data over time. A dedicated laptop is to provide secure data storage and project coordination.

**Participant Payments:** The amount of participant time involved requires payment over four visits, for daily tracker wearing, and bonuses for reliable wearing of the devices. Many participants with socially isolating conditions do not drive. Transportation calculated by Uber charges as an estimate of travel costs to and from the study site.

**Travel:** Registration for three conferences to present findings and seek future collaboration for cross-institutional research.

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22. How Suicide Quietly Morphed Into a Public Health Crisis - The New York Times. Available at: <https://www.nytimes.com/2018/06/08/health/suicide-spade-bordain-cdc.html>. (Accessed: 25th January 2019)

### External Funding Opportunities

<i>Grant</i>	<i>Funding</i>	<i>Application date</i>	<i>Notes</i>
<i>Year 1: Before completion of data collection, we plan to apply for funding to expand to additional populations using the same methodology.</i>			
Robert Wood Johnson Foundation's (RWJF) Health Data for Action (HD4A)	<b>\$150,000 1 year</b>	<b>September 2019</b>	Priority = “innovative research projects that use rich, unique data sources to draw new actionable insights for health-related policies and programs.” <i>Well-matched to our project, would allow us to expand to younger populations using same methodology.</i>
<i>Year 2: As preliminary data and analysis are completed, we will use our pilot methods and results to demonstrate proof of concept for tying big data analysis to individual data collected, then develop pathways for application of preventative strategies based on data in college-age adults.</i>			
NIH R01 PAR-18-929: High-Priority Areas for Research Leveraging Electronic Health Records and Large-Scale Data	<b>\$250,000/ year for 5 years</b>	<b>Projected 11/2020</b>	Priority = “applications to leverage large-scale, real-world data from electronic health records (EHRs) to understand risk, onset, course, and impact of treatments and services for mental and neurological disorders”
HRSA 19-090 Autism secondary data analysis research using national datasets	<b>\$100,000 1 year</b>	<b>January 2020</b>	Priority = enhancing access to mental health care for children and adolescents with autism spectrum disorder Priority = novel approaches <i>National datasets with similar variables exist to support this downward extension of the project.</i>
The Substance Abuse and Mental Health Services Administration's (SAMHSA) Garrett Lee Smith Campus Suicide Prevention grant	<b>\$102,000 each year 3 years</b>	<b>March 2020</b>	Priority = The purpose of this program is to facilitate a comprehensive approach to preventing suicide in institutions of higher education. Awards given to up to 20 institutions. <i>This is an excellent match for application of our findings to direct care and preventative care on our campus.</i>
<i>Year 3 and beyond: With finalization of the project, we will continue with efforts to expand to younger populations who have more difficulty effectively accessing mental health services than college-age adults. We also expect to have developed relationships with other institutions as grant partners.</i>			
NIMH PA-18-350 NIMH Exploratory/Development research grant	<b>\$200,000</b>	<b>January 2021</b>	Priority = Novel approaches to mental health improvement <i>Our data collection should be complete, allowing us to report findings and successful methodology for downward extension to younger age group.</i>

## BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.  
Follow this format for each person. **DO NOT EXCEED TWO PAGES.**

NAME Terisa Poulsen Gabrielsen	POSITION TITLE Assistant Professor, School Psychology Dept. of Counseling, Psychology and Special Education
eRA COMMONS USER NAME (credential, e.g., agency login) TGABRIELSEN – CITI Username = agabrielsent	

### EDUCATION/TRAINING

*(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Brigham Young University, Provo, UT	B.S.	04/82	Business Management
University of Utah, Salt Lake City, UT	M.S.	05/09	School Psychology
University of Utah, Salt Lake City, UT	Ph.D	08/12	School Psychology
Children's Hospital of Philadelphia, Pennsylvania	Intern	6/11 – 6/12	Pediatric Psychology and Autism
Center for Autism Research, Children's Hospital of Philadelphia, Pennsylvania	Post-Doctoral Fellow	7/12 – 7/13	Autism

### Research Qualification Statement.

I have extensive research and clinical experience in screening and diagnosis of autism spectrum disorders. My research line has focused on screening and identification of autism and I am research reliable on the gold standard observational measure for autism, the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2). I have been involved as a clinical post-doctoral fellow on multi-site network autism diagnostic studies, including the Infant Brain Imaging Study (IBIS). I was also a clinician on multiple studies with imaging components across age groups at the Center for Autism Research (CAR) at Children's Hospital of Philadelphia. My interdisciplinary training has been across both school and health care settings, which has shaped my ability to train, support, and educate parents, teachers, and practitioners in care planning and intervention for individuals with autism spectrum disorders. Although I have consistently specialized in autism spectrum disorders, my training, practice, and teaching includes emphasis on differential diagnosis and co-morbid conditions across the lifespan. I am a licensed psychologist in Utah and a licensed school psychologist. As a trainer of graduate students across disciplines in psychology and special education, I teach behavioral assessment and intervention (from Board Certified Behavior Analyst [BCBA] standards), cognitive assessment, interdisciplinary clinical practice, and an autism course. We also have a deep pool of behavioral expertise within our interdisciplinary autism research group at BYU to draw from, including faculty members with BCBA's. My contributions to the current project include direct assessment, intake and family preparation protocols, and developing individualized behavioral protocols for laying still in the scanners.

### Publications Most Relevant to Current Proposal (reverse chronological order)

**Gabrielsen, T.P.**, Anderson, J.S., Stephenson, K.G., Beck, J., King, J.B., Kellems, R., . . . South, M. (2019) Functional MRI connectivity of children and adolescents with autism and low verbal and cognitive abilities. *Molecular Autism* 9:67 <https://doi.org/10.1186/s13229-018-0248-y>

- \*Rosenbaum, M. **Gabrielsen, T.P.** (2019). Decision factors for community providers when referring very young children for autism evaluation. *Research in Autism Spectrum Disorders*, 57, 87-96 <https://doi.org/10.1016/j.rasd.2018.09.009>
- \*Anderberg, E., Cox, J., Tass, S., Erekson, D., **Gabrielsen, T.**, Warren J., South, M. (2017) Sticking with it: Psychotherapy outcomes for adults with autism spectrum disorder in a college counseling center setting. *Autism Research*, 10 (12), 2048–2055 doi:[10.1002/aur.1843](https://doi.org/10.1002/aur.1843)
- \*Ahlers, K., & **Gabrielsen, T.**, \*Lewis, D., \*Brady, A., \*Litchford, A. (2017) Supporting individuals with autism spectrum disorder in understanding and coping with complex social emotional issues. *School Psychology International* 38(6), 586-607. (Co-first author). doi: [10.1177/0143034317719942](https://doi.org/10.1177/0143034317719942)
- \*Ahlers, K. & **Gabrielsen, T.P.**, Ellzey, A., Brady, A., Litchford, A., Fox, J., . . . Carbone, P. (2018) A pilot project utilizing pediatricians as initial diagnosticians in multidisciplinary autism evaluations for young children. *Journal of Developmental and Behavioral Pediatrics*. doi: [10.1097/DBP.0000000000000621](https://doi.org/10.1097/DBP.0000000000000621)
- Cardinal, J. & **Gabrielsen, T.**, Nicksic-Springer, T., Knorr, J., Kellems, R., Young, E., Hansen, B. (2017) Discrete trial teaching interventions for students with autism: Web-based video modeling for paraprofessionals. *Journal of Special Education Technology* 32(3), 138-148 doi [10.1177/0162643417704437](https://doi.org/10.1177/0162643417704437) (Co-first author)
- Lundwall, R. A., \*Stephenson, K. G., Neely-Tass, E. S., Cox, J. C., South, M., Bigler, E. D., \*Anderberg, E., Prigge, M. D., Hansen, B. D., Lainhart, J. E., Kellems, R. O., Petrie, J., & **Gabrielsen, T. P.** (2017). Brain volumes associated with high levels of aggression in male children diagnosed with autism spectrum disorder. *Research in Autism Spectrum Disorders* 34, 44-51. <http://dx.doi.org/10.1016/j.rasd.2016.12.001>. (Senior author)
- Miller, J, Davignon, M, **Gabrielsen, T**, Friedlaender, E. Evaluating and measuring outcomes: Systematically improving the healthcare experience for individuals with autism spectrum disorder. Giarelli E. & Fisher K. (Eds.), *Integrated Health Care for People with Autism Spectrum Disorders: Interdisciplinary Planning and Delivery of Care*. 2015. Springfield, IL: Charles C. Thomas, Publishers
- Gabrielsen T**, Farley M, Speer L, Villalobos M, Baker C, Miller J. Identifying Autism in a Brief Observation. *Pediatrics*. 2015;135(2), epub ahead of print, Jan. 12, 2015.
- Gabrielsen, T.**, Miller,J., Friedlaender, E. Pathway for the Approach to Managing Behaviors in Children with Autism Spectrum Disorder (ASD)/Developmental Disorders. *Clinical Pathways*. Philadelphia: Children’s Hospital of Philadelphia. 2014 <http://www.chop.edu/pathways/shared-pathways/autism-spectrum-developmental-disorder/>
- Miller J, **Gabrielsen T**, Villalobos M, et al. The Each Child Study: Systematic screening for autism spectrum disorders in a pediatric setting. *Pediatrics*. 2011;127:866-871.
- Jenson, WR, Clark, E, Bowen, J, Block, H, **Gabrielsen, T**, Hood, J, Radley, K, Springer, B. *Superhero Social Skills: A Multimedia Program*. 2011. Eugene, OR: Pacific Northwest.
- Gabrielsen, T.** & Clark, E. (2011) Social awareness. In J.S. Kreutzer & J. Deluca (Eds.), *Encyclopedia of Clinical Neuropsychology*. New York: Springer.

#### **Additional recent publications of importance to the field (in chronological order)**

- Kellems, R, **Gabrielsen, T**, Williams, C. The use of visual organizers: Supporting executive functioning and academics. In Cardon, T. (Ed.) *The Use of Technology in the Treatment of Autism Spectrum Disorders*, 2015 New York: Springer.

## MIKLE SOUTH: BRIEF CURRICULUM VITAE

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BRIGHAM YOUNG UNIVERSITY  
DEPARTMENT OF PSYCHOLOGY  
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---

### RECENT PROFESSIONAL EXPERIENCE

#### *Brigham Young University*

2014-present Associate Professor, Department of Psychology

#### *University of Utah School of Medicine*

2016-present Adjunct Professor, Department of Neurology

#### *Durham University UK, Department of Psychology*

2017 International Senior Research Fellow

#### *Timpanogos Assessment and Psychological Services*

2011-present President of private psychology practice

#### *State of Utah*

2007-present Licensed Psychologist #6841090-2501

---

### EDUCATION

#### *Yale University School of Medicine*

2005-2007 Post-Doctoral Fellow, Developmental Neuroimaging Program

#### *University of Utah*

Awarded 2005 PhD, Clinical Child Psychology

#### *Primary Children's Medical Center*

2004-2005 Psychology fellow (predoctoral internship)

#### *Yale University*

Awarded 1994 BA, Psychology (Intensive Research Track)

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### SELECTED RECENT PEER REVIEWED ARTICLES

\* = MENTORED STUDENT AUTHOR

\*Top, D. N. Jr., Luke, S. G., \*Stephenson, K. G., & **South, M.** (2019). Sensory sensitivity as a mechanism for emotional and psychophysiological arousal in a cross-clinical sample of autistic and non-autistic anxious adults. *Frontiers in Psychiatry: Child and Adolescent Psychiatry*.

\*Maisel, M. E., \*Stephenson, K. G., Cox, J., & **South, M.** (2019). Cognitive defusion for managing distressing thoughts in adults with autism. *Research in Autism Spectrum Disorders*.

\*Russell, N. C. C., **South, M.**, Lundwall, R. A., & Luke, S. G. (2019). Not So Fast: Autistic Traits and Anxious Apprehension in Real-World Visual Search Scenarios. *Journal of Autism and Developmental Disorders*

Gabrielsen, T. P., Anderson, J. S., \*Stephenson, K. G., \*Beck, J. S., King, J. B., Kellems, R., \*Top, D. N. Jr., \*Russell, N.C.C., \*Anderberg, E., Lundwall, R., Hansen, B., & **South, M.** (2018). Functional connectivity of children with autism and low verbal and cognitive performance. *Molecular Autism*.

Vasa, R., Keefer, A., Reaven, J., **South, M.**, & White, S. W. (2018). Priorities for advancing research on youth with Autism Spectrum Disorder and co-occurring anxiety. *Journal of Autism and Developmental Disorders*, 48, 925-934.

\*Anderberg, E., Cox, J. C., Neely Tass, E. S., Erekson, D. M., Gabrielsen, T. P., Warren, J. S., \*Cline, J., \*Peterson, D., & **South, M.** (2017). Sticking with it: psychotherapy outcomes for adults with Autism Spectrum Disorder in a college counseling center setting. *Autism Research*, 10, 2048–2055.

**South, M.** & Rodgers, J. (2017). Sensory, emotional and cognitive contributions to anxiety in Autism Spectrum Disorders. *Frontiers in Human Neuroscience*, 11. *Special Topic: The medial prefrontal cortex and integration in ASD and typical cognition*.

**South, M.**, \*Carr, A. W., \*Stephenson, K. G., & \*Maisel, M. E. (2017). Symptom overlap on the SRS-2 between adults with high anxiety and adults with ASD. *Autism Research*, 10, 1215-1220.

#### RECENT FUNDING

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2019-2021    \$20000    *Multi-modal investigation of sleep dysfunction and anxiety in autistic adults*. Source: BYU MEG grant. Role: Co-Investigator with Daniel Kay, Department of Psychology.

2017-2018    \$20000    *Unseen, but in plain sight: identifying developmental patterns of females with symptoms of autism spectrum disorder*. Source: BYU MEG grant. Role: consulting investigator; Principal Investigators: Jonathan Cox and Rebecca Lundwall

2014-2016    \$66000    *Improving the lives of children with autism and their families through interdisciplinary research, training, and community partnerships*. Source: BYU McKay School of Education. Role: Co-Investigator with Terisa Gabrielsen, Blake Hansen

2016            \$3000    *Mindfulness treatment for anxiety and alexithymia in adults diagnosed with autism spectrum disorder*. Source: BYU FHSS Role: Co-Investigator, Jon Cox



## Part G: Biographical Sketch

BYU IRB USE ONLY:

ID #

Institutional Review Board for Human Subjects

Provide the following information for the Primary Investigator/Research Personnel and other significant contributors in the order listed on the IRB Application, page 1.

Follow this format for each person. **DO NOT EXCEED TWO PAGES PER PERSON.**

### Part A: Basic Information

1. Name E. Shannon Neeley Tass

2. CITI Username esneeley

3. Position Title (PI, co-PI, Research Personnel) co-PI

### Part B: Education/Training

Institution and Location	Degree (If applicable)	MM/YY	Field of Study
Brigham Young University	BS	04/2001	Statistics
Brigham Young University	MS	08/2003	Statistics
Rice University	PhD	01/2009	Statistics

### Part C: Research Qualification Statement

I have a PhD in Statistics and have worked on projects involving various different types of data, including spatially and temporally correlated data, repeated measurements, microarrays, and structural MRI. I have also recently collaborated on several projects relating to individuals with Autism. I have used a diverse set of statistical tools from basic linear models to more complicated classification and regression trees, multivariate models, and generalized linear models. I have also done statistical work in genetics and proteomics (microarrays), spatial and environment problems, biostatistics, and astronomy. Many of the statistical methods I have applied in other areas are directly applicable to the analysis of the physiological and other data proposed in this project, including handling large datasets, spatially and temporally correlated data, multivariate analysis, (Please provide a brief explanation of your training and research experience that qualifies you to conduct the proposed research.)

### Part D: Relevant Publications

#### PAPERS RELATING TO AUTISM AND STATISTICAL ANALYSIS OF DIFFERENT DATA TYPES:

1. David M. Erekson, Rachelle Clayson, So Yeon Park, Shannon Tass. (2018). Therapist effects on early change in psychotherapy in a naturalistic setting, *Psychotherapy Research*, DOI: 10.1080/10503307.2018.1556824
2. White PA, Berrett C, Neeley-Tass ES, Findley MG. (2018). Modeling efficiency of foreign aid allocation in Malawi. *The American Statistician*, DOI: 10.1080/00031305.2018.1470032

interstate network. *Statistical Modelling*. doi: 10.1177/1471082X17722072

4. Ahern AA, Radebaugh J, Christiansen EH, Harris RA, Tass ES. (2017). Lineations and structural mapping of Io's patarae and mountains: Implications for internal stresses. *Icarus*. 297:14-32.
5. Anderberg E, Cox JC, Neeley Tass ES, Erekson DM, Gabrielsen TP, Warren JS, Cline J, Petersen D, South M. (2017). Sticking with it: Psychotherapy Outcomes for adults with autism spectrum disorder in a university counseling center setting. *Autism Research*. 10(12):2048–2055.
6. Lundwall RA, Stephenson KG, Neeley-Tass ES, Cox JC, South M, Bigler ED, Anderberg E, Prigge MD, Hansen BD, Lainhart JE, Kellems RO. (2016). Relationship between brain stem volume and aggression in children diagnosed with autism spectrum disorder. *Research in Autism Spectrum Disorders*. 2016 Dec 9.
7. Jensen JL, Neeley S, Hatch JB, Piorczynski T. (2015) Learning Scientific Reasoning Skills May Be Key to Retention in Science, Technology, Engineering, and Mathematics. *Journal of College Student Retention: Research, Theory & Practice*. October 28, 2015, 1521025115611616, doi: 10.1177/1521025115611616
8. Ruvolo PP, Qiu Y, Coombes KR, Zhang N, Neeley ES, Ruvolo VR, Hamilton Jr, Borthakur G, Konopleva M, Andreff M, Kornblau SM. (2015) Phosphorylation of GSK3 $\alpha/\beta$  correlates with activation of AKT and is prognostic for poor overall survival in acute myeloid leukemia patients. *BBA Clinical*. 4:59-68. doi: 10.1016/j.bbacli.2015.07.001
9. Neeley ES, Christensen WF, Sain SR (2013). A Bayesian Spatial Factor Analysis Approach for Combining Climate Model Ensembles. *Environmetrics*. 25(7):483-497.
10. Prigge MB, Lange N, Bigler ED, Merkley TL, Neeley ES, Abildskov TJ, Froehlich AL, Nielsen JA, Cooperrider JR, Cariello AN, Ravichandran C, Alexander AL, Lainhart JE. (2013) Corpus Callosum area in children and adults with autism. *Res Autism Spectr Disord*. 7(2):221-234.
11. West J, Hall P, Hanson C, Prier, K, Giraud-Carrier C, Neeley ES, Barnes M. (2012) Temporal variability of problem drinking on Twitter. *textitOpen Journal of Preventive Medicine*, 2, 43-48. doi: 10.4236/ojpm.2012.210
12. Neeley ES, Kornblau SM, Baggerly KA. (2011). Surface adjustment of reverse phase protein arrays using positive control spots. *Cancer Informatics*. 11:77-86.
13. Heltemes-Harris LM, Willette MJ, Ramsey LB, Qiu YH, Neeley ES, Zhang N, Thomas DA, Koeuth T, Baechler EC, Kornblau SM, Farrar MA. (2011). Ebf1 or Pax5 haploinsufficiency synergizes with STAT5 activation to initiate acute lymphoblastic leukemia. *Journal of Experimental Medicine*. 208(6):1135-1149.
14. Tate DF, Khedraki R, Neeley ES, Ryser D, Bigler ED. (2011). Cerebral volume loss, cognitive deficit and neuropsychological performance: Comparative measures of brain atrophy II: Traumatic brain injury. *Journal of the International Neuropsychological Society*. 17(2):308-316.
15. Tate DF, Neeley ES, Norton MC, Tschanz JT, Miller MJ, Wolfson L, Hulette C, Leslie C, Welsh-Bohmer KA, Plassman B, Bigler ED. (2011). Intracranial volume and dementia: Some evidence in support of the cerebral reserve hypothesis. *Brain Research*. 1385:151-162.
16. Ghia AJ, Neeley ES, Gaffney DK. (2010). Postoperative radiotherapy use and patterns of care analysis for node positive or parametria positive cervical cancer. *Gynecologic Oncology*. 119(3):411-416.
17. Brown AP, Neeley ES, Werner T, Soisson AP, Burt RW, Gaffney DK. (2010). A population-based study of subsequent primary malignancies after endometrial cancer: Genetic, environmental, and treatment-related associations. *International Journal of Radiation Oncology?Biology?Physics*. 78(1):127-135.
18. Trusov A, Bumgarner R, Valijev R, Chestnova R, Talevski S, Vragoterova C, Neeley ES. (2009). Comparison of Lumin LED fluorescent attachment, fluorescent microscopy and Ziehl-Neelsen for AFB diagnosis. *The International Journal of Tuberculosis and Lung Disease*, 13(7):836-841.
19. Neeley ES, Kornblau SM, Coombes KR, Baggerly KA. (2009). Variable slope normalization of reverse phase



**MICHAEL D. BARNES, PhD, MCHES**

Professor of Public Health; Associate Dean, College of Life Sciences  
5011 LSB, Telephone: 801.422.3327. E-mail: [michael\\_barnes@byu.edu](mailto:michael_barnes@byu.edu).

**EDUCATION**

- Ph.D. Southern Illinois University 1993 Community Health Education
- M.S. Brigham Young University 1990 Community Health Education
- B.S. Brigham Young University 1989 Health Management/Promotion
  - Minor: Gerontology
- A.A. Ricks College 1986 Health Science

**SELECTED PUBLICATIONS** (64 published at BYU since 1997)

Barnes, M., Hanson, C.L., & Giraud-Carrier, C. (2018). The case for computational health science. *Journal of Healthcare Informatics Research*, 2(1), 99-110. [https://doi.org/ 10.1007/s41666-018-0024-y](https://doi.org/10.1007/s41666-018-0024-y)

Jashinsky, J., Magnusson, B., Hanson, C., & Barnes, M. (2017). Media agenda setting regarding gun violence before and after a mass shooting. *Frontiers in Public Health*, Section Public Health Policy. 4(291). doi.org/10.3389/fpubh.2016.00291

Covey, E.L., Belevvedere, L.M., & Barnes, M.D. (2017). Health Impact Assessment of the Proposed Opioid Authorization Policy in the State of Utah, USA. *Health Systems and Policy Research* 3(4:40)  
DOI:10.21767/2254-9137.100059

Barnes, M. Heaton, T, Goates, M. & Packer, J. (2016, invited contributor, peer review). Intersystem Implications of the Developmental Origins of Health and Disease: Advancing Health Promotion in the 21st Century. *HealthCare*, 4(3), pg. 50-59 Doi 10.3390/healthcare4030045

Braithwaite, S., Giraud-Carrier, C, West, J, Barnes, M, and Hanson, C. (2016). Validating Machine Learning Algorithms for Twitter Data Against Established Measures of Suicidality. *Journal of Medical Internet Research - Mental Health*, 3(2), e21

Lister, C., Royne, M.B., Payne, H.E., Cannon, B., Hanson, C.L., Barnes, M.D. (2015). The laugh model: Reframing public health communication through social media. *American Journal of Public Health*, 105(105), 2245-2251

Hanson, C, West, J, Thackeray, R, & Barnes, M (2014) Understanding and predicting social media use for health information and support among community health center patients. *Journal of Medical Internet Research*, 16(11), e270

Steadman, M., Bush, J.K., Thygeson, S.M. & Barnes, M. (2014). Graduated driver licensing provisions: An analysis of state policies and what works. *Traffic Injury Prevention* 15(4), 343-348. Doi: 10.1080/15389588.2013.822493

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Barnes, M., Wykoff, R., King, L., & Petersen, D. (2012). New developments in undergraduate education in public health: Implications for health education and health promotion. *Health Education & Behavior*, 39(6), 719-724. Doi:10.1177/1090198112464496.

Davis, S. McKenzie, J., Baldwin, S., Mata, H., Capwell, E., Seabert, D., Barnes, M., & Burak, L. (2012). Professional development through planning for and/or participating in an accreditation/approval review. *Health Promotion Practice*, 13(5), 591-598.

Burton, S., Kesler, T., Giraud-Carrier, C., West, J., & Barnes, M. (2012). Right Time, Right Place“ Health Communication on Twitter: Value and Accuracy of Location Information. *Journal of Medical Internet Research*, 14(6), e156

Neiger, B., Thackeray, R., VanWagenen, Hanson, C., West, J., Barnes, M. & Fagen, M. (2012). Use of social media in health promotion: purposes, key performance indicators, and evaluation metrics. *Health Promotion Practice*, 13(4), 159-164

West, J, Hall, P., Hanson, C., Barnes, M., Giraud-Carrier, C., Barrett, J. (2012). There’s an App for that: Using the precede-proceed model to conduct a content analysis of itune’s Health Care & Fitness Apps. *Journal of Medical Internet Research*, 14(3), e72. Doi:10.2196/jmir.1977.

Hanson, C., Barrett, J., West, J., & Barnes, M. (2012). Protecting public health in a social media world: policy responses to online threats. *Internet Journal of Public Health*, 2(1). ISSN: 2155-6733.

West J., Hall, C., Prier, K., Hanson, C., Giraud-Carrier, C., Neeley, S., Barnes, M. & Fagen, M. (2012). Temporal variability of problem drinking on Twitter. *Open Journal of Preventive Medicine*, 2(1), 43-48. Doi:10.4236/ojpm.2012.21007.

Neiger, B., Thackeray, R., VanWagenen, S., Hanson, C., West, J., & Barnes, M. (2012). Use of social media in health promotion: Purposes, key performance indicators and evaluation metrics. *Health Promotion Practice*, 13(2), 159-164. Doi:10.1177/1524839911433467.

Hanson, C., West, J., Barnes, M., Thackeray, R., Neiger, B. & McIntyre, E. (2011). Use and acceptance of social media among health educators, *American Journal of Health Education*, 42(3), 197-20

**FUNDED RESEARCH/GRANTS:** (Total Funded at BYU: \$1,029,379 – Externally Funded: \$870,492)

Drug-free Communities Grant; \$38,670. SAMHSA through Utah County Department of Drug and Alcohol Prevention. Giraud-Carrier, C., Hanson, C. & Barnes, M. 12/2017-2021

iKeepSafe; externally funded \$10415. A Computational Health Science Assessment of Adolescent Unwanted Online Experience, Hanson, C., Barnes, M., Giraud-Carrier, C. 7/2015-2/2016



## Part G: Biographical Sketch

BYU IRB USE ONLY:

ID #

Institutional Review Board for Human Subjects

Provide the following information for the Primary Investigator/Research Personnel and other significant contributors in the order listed on the IRB Application, page 1.

Follow this format for each person. **DO NOT EXCEED TWO PAGES PER PERSON.**

### Part A: Basic Information

1. Name	Jonathan Cox
2. CITI Username	skjoldson
3. Position Title (PI, co-PI, Research Personnel)	co-PI

### Part B: Education/Training

Institution and Location	Degree (If applicable)	MM/YY	Field of Study
Brigham Young University, Provo, UT	Ph.D.	08/2008	Clinical Psychology

### Part C: Research Qualification Statement

I have conducted multiple research projects and published on clinical issues in counseling centers.

*(Please provide a brief explanation of your training and research experience that qualifies you to conduct the proposed research.)*

### Part D: Relevant Publications

Anderberg, E., Cox, J. C., Neely Tass, E. S., Erikson, D. M., Gabrielsen, T. P., Warren, J. S., Cline, J., Peterson, D., & South, M. (2017). Sticking with it: psychotherapy outcomes for adults with Autism Spectrum Disorder in a college counseling center setting. *Autism Research*, 10, 2048–2055. DOI 10.1002/aur.1843.

Allen, G. E. K., Cox, J. C., Smith, T. B., Hafoka, O., Griner, D., Beecher, M. E. (2016) Psychotherapy utilization and presenting concerns among Polynesian American college students, *The Counseling Psychologist*. 44, 28-49.

Baker, E., Burlingame, G. M., Cox, J. C., Beecher, M. E., & Gleave, R. L. (2013). The Group Readiness Questionnaire: A Convergent Validity Analysis. *Group Dynamics: Theory, Research, and Practice*. 17, 299-314. doi:10.1037/a0034477

Burlingame, G. M., Cox, J. C., Davies, D. R., Layne, C. M., & Gleave, R. (2011) The Group Selection

Ver. 06/14

Cox, J. C. (2008) Selecting Members for Group Therapy: A Validation Study of the Group Selection Questionnaire. Unpublished Doctoral Dissertation. Brigham Young University, Provo.

Cox, J. C., Davies, D. R., Burlingame, G. M., Campbell, J. E., Layne, C. M., & Katzenbach, R. J. (2007) Effectiveness of a trauma/grief-focused group intervention: A qualitative study with war-exposed Bosnian adolescents. *International Journal of Group Psychotherapy*, 57, 319–345.

## CARL L. HANSON, PhD, MCHES

Professor and Chair, Department of Public Health, College of Life Sciences  
Brigham Young University

### EDUCATION

- Ph.D. Southern Illinois University at Carbondale, 1994
  - Community Health Education
- M.S. Brigham Young University, 1991
  - Health Science
- B.S. Brigham Young University, 1990
  - Psychology

### SELECTED PUBLICATIONS

Hanson, C.L., Crandall, A., Barnes, M., Magnusson, B., Novilla, L. & King, J. (2019). Family-focused public health: Supporting Homes and Families in Policy and Practice. *Frontiers in Public Health*. (In Process).

Barnes, M., Hanson, C.L., & Giraud-Carrier, C. (2018). The case for computational health science. *Journal of Healthcare Informatics Research*, 2(1), 99-110. <https://doi.org/10.1007/s41666-018-0024-y>

Crandall, A., Allsop, Y., & Hanson, C.L. (2018). The longitudinal association between cognitive control capacities, suicidality, and depression during late adolescence and young adulthood. *Journal of Adolescent Health*, 65, 167-176.

<https://doi.org/10.1016/j.adolescence.2018.03.009>

Wilkinson, J., Ashby, M.G., Rusoja, E., Hanson, C.L., & Swanson, R.C. (2017). The application of systems thinking concepts, methods and tools to global health practices: An analysis of case studies. *Journal of Evaluation in Clinical Practice*, 24(3), 607-618.

Lister, C., Payne, H., Hanson, C.L., Barnes, M.D., & Manwaring, T. (2017). The public health innovation model: Merging public health strengths with private sector processes. *Frontiers in Public Health*, 5, 192. <https://doi.org/10.3389/fpubh.2017.00192>

Chary, M., Genes, N., Giraud-Carrier, C., Hanson, C.L., Nelson, A.F., & Manini, A.F. (2017). Estimating prescription drug misuse from Twitter. *Journal of Medical Toxicology*. 13(40), 278-286. <https://doi.org/10.1007/s13181-017-0625-5>

Jashinsky, J., Magnusson, B., Hanson, C.L., & Barnes, M. (2017). Media agenda setting regarding gun violence before and after a mass shooting. *Frontiers in Public Health*, 4, 291. <https://doi.org/10.3389/fpubh.2016.00291>

Braithwaite, S.R., Giraud-Carrier, C., West, J., Barnes, M. & Hanson, C.L. (2016). Validating machine learning algorithms for Twitter data against established measures of suicidality. *JMIR Mental Health*, 3(2), e21.

Merrill, R.M. & Hanson, C.L. (2016). Risk and Protective Factors Associated with Being Bullied on School Property Compared with Cyberbullied. *BMC Central*, 16(145), 1-10.

Strong, J., Hanson, C.L., Magnusson, B., & Neiger, B. (2015). Health education specialists' knowledge, attitudes, and perceptions of the Patient Protection and Affordable Care Act. *Health Promotion and Practice*, 1-9.

Lister, C., Royne, M.B., Payne, H.E., Cannon, B., Hanson, C.L., & Barnes, M.D. (2015). The laugh model: Reframing public health communication through social media. *American Journal of Public Health*, 105(11), 2245-2251.

Hanson, C.L., West, J., Thackeray, R., Barnes, M.D., & Downey, J. (2014). Understanding and predicting social media use for health information and support among community health center patients. *Journal of Medical Internet Research*, 16(11), e270.

Merrill, R., Hedin, R., Sloan, A.A., Fondario, A., & Hanson, C.L. (2013). Drug-related deaths according to ethnicity in Utah. *Journal of Addiction*, 2013, 1-6.

Hanson, C.L., Cannon, B., Burton, S., Giraud-Carrier, C. (2013). An exploration of social circles and prescription drug abuse through Twitter. *Journal of Medical Internet Research*, 15(9), e189. DOI: 10.2196/jmir.2741

Hanson, C.L., Burton, S., Giraud-Carrier, C., West, J., Barnes, M., & Hansen, B., (2013). Tweaking and tweeting: Exploring Twitter for non-medical use of Adderall among college students. *Journal of Medical Internet Research*, 15(4), e62. DOI:10.2196/jmir.2503

Jashinsky, J., Burton, S., Hanson, C.L., West, J., Giraud-Carrier, C., Barnes, M., & Argyle, T. (2013). Tracking suicide risk factors through Twitter in the U.S. *Journal of Crisis Intervention and Suicide Prevention*, 1-7.

West, J., Hall, P., Hanson, C.L., Barnes, M.D., Giraud-Carrier, C., & Barrett, J. (2012). There's an app for that: Content analysis of iTunes's health care and fitness apps. *Journal of Medical Internet Research*, 14(3), e72.

Taylor, S., Ward, P.J., Hill, B.J., & Hanson, C.L. (2012). Influence on active family leisure and its relationship to obesity. *Leisure Sciences*, 34(4), 332-349.

Hanson, C.L., Barrett, J., West, J., & Barnes, M.D. (2012). Protecting public health in a social media world: Policy responses to online threats. *Internet Journal of Public Health*, 2(1). DOI: 10.5580/2b57.

West, J.H., Hall, C.P., Hanson, C.L., Prier, K., Giraud-Carrier, C., Neeley, E.S., & Barnes, M.D. (2012). Temporal variability of problem drinking on Twitter. *Open Journal of Preventive Medicine*, 2(1). DOI: 10.4236/ojpm.2012.21007.

Neiger, B., Thackeray, R., Van Wagenen, S.A., Hanson, C.L., West, J., Barnes, M. & Fagen, M.C. (2012). Use of social media in health promotion: Purposes, key performance indicators and evaluation metrics. *Health Promotion Practice*, 13(2), 159-164. DOI: 10.1177/1524839911433467

Burton, S., Morris, R., Dimond, M. Hansen, J. Giraud-Carrier, C., West, J., Hanson, C.L., & Barnes, M.D. (2012). Public health community mining in YouTube. *Proceedings of the International Health Informatics Symposium*, 81-90. DOI: 10.1145/2110363.2110376



## Part G: Biographical Sketch

BYU IRB USE ONLY:

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Institutional Review Board for Human Subjects

Provide the following information for the Primary Investigator/Research Personnel and other significant contributors in the order listed on the IRB Application, page 1.

Follow this format for each person. **DO NOT EXCEED TWO PAGES PER PERSON.**

### Part A: Basic Information

1. Name Lundwall, Rebecca A

2. CITI Username beckylundwall

3. Position Title (PI, co-PI, Research Personnel) PI

### Part B: Education/Training

Institution and Location	Degree (If applicable)	MM/YY	Field of Study
Brigham Young University, Provo, UT	BS	04/1987	Pre-Physical Therapy
Brigham Young University, Provo, UT	MEd	08/1990	Counseling & Guidance
Rice University, Houston, TX	MA	12/2011	Cognitive Neuroscience
Rice University, Houston, TX	PhD	08/2013	Cognitive Neuroscience

### Part C: Research Qualification Statement

As a developmentalist in the Psychology Department and an affiliate of the Neuroscience Center, I conduct studies with infants, children, and adults. I have interest in typically developing and atypical populations, such as those with an attentional or cognitive deficits (including those with autism, traumatic brain injury, or attention deficit disorder). The goal of my research is to clarify influences on cognitive development from infancy to adulthood.

To reach my goals, I use psychometric, neuroimaging, genetic, self-report, and interview methodology. For example, my psychometric approaches use reaction time and accuracy to visually presented stimuli such as geometric shapes. My neuroimaging studies use function magnetic resonance imaging to explore association with behavior in those with traumatic brain injury or autism. I collect saliva samples to examine individual differences in neurotransmitter production. I gather information from participants on their nutrition, academic functioning, peer-relationships, and socio-economic experiences to look for associations with brain-related outcomes. Some of my studies involve collecting longitudinal information to answer particularly intriguing questions about the trajectories of development that cannot be satisfactorily answered in other ways.

## Part D: Relevant Publications

1. Lundwall, R. A., \*\*Hodges, C., & \*Kotter, A. D. (revisions requested). Balancing needs in publishing with undergraduate and graduate students at doctoral degree-granting universities. *Frontiers in Psychology*.
2. Lundwall, R. A. (revisions requested). Changing institutional incentives to foster sound scientific practices: One department. Guest Editor: Michael C. Frank. Special Issue of *Infant Behavior and Development*.
3. ManyBabies Consortium (pre-registered [accepted pending manuscript submission]). Quantifying sources of variability in infancy research using the infant-directed speech preference. *Advances in Methods and Practices in Psychological Science*.
4. Gabrielsen, T. P., Anderson, J. S., \*\*Stephenson, K. G., \*\*Beck, J., King, J. B., Kellems, R., \*\*Top, D. N. Jr., \*\*Russell, N. C. C., \*\*Anderberg, E., Lundwall, R. A., Hansen, B., & South, M. (2018). Functional MRI connectivity of children with autism and low verbal and cognitive abilities. *Molecular Autism*, 9:67. doi:10.1186/s13229-018-0248-y
5. \*\*Russell, N. C. C., Luke, S. G., Lundwall, R. A., & South, M. (2018). Not So Fast: Autism and Anxiety in Real-World Visual Search Scenarios. *Journal of Autism and Developmental Disorders*.
6. Lundwall, R. A., \*Woodruff, J., & \*Tolboe, S. P. (2018). RT slowing to valid cues on a reflexive attention task in children. *Frontiers in Psychology*.
7. \*Christensen, K. E., & Lundwall, R. A. (2018). Errors on a computer task and subclinical symptoms of attention-deficit/hyperactivity disorder (ADHD). *Scandinavian Journal of Psychology*. doi:10.1111/sjop.12462
8. Lundwall, R. A., & \*\*Hodges, C. (2018). Error rate on a computer task and parent ratings of inattention predict state reading scores. *Frontiers in Education*.
9. Lundwall, R. A., \*Sgro, J. F., & \*Fanger, J. (2018). Response time scores on a reflexive attention task predict a child's inattention score from a parent report. *PLOS ONE*, 13(1): e 0190724
10. Lundwall, R. A., \*Sgro, J., & \*Wade, T. (2017). SLC6A3 predicts relational aggression in children. *Journal of Individual Differences*, 38(4): 220-229. doi: 10.1027/1614-0001/a000239
11. Lundwall, R. A., \*\*Stephenson, K. G., Neely-Tass, E. S., Cox, J. C., South, M., Bigler, E. D., \*\*Anderberg, E., Prigge, M. D., Hansen, B. D., Lainhart, J. E., Kellems, R. O., Petrie, J., & Gabrielsen, T. P. (2017). Relationship between brain stem volume and aggression in children diagnosed with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 34: 44-51. doi:10.1016/j.rasd.2016.12.001
12. Lundwall, R. A., Goldsmith, H. H. & Dannemiller, J. L. (2017). Genetic associations with reflexive visual attention in infancy and childhood. *Developmental Science*, 20(3). doi: 10.1111/desc.12371
13. Lundwall, R. A., & \*Rasmussen, C. B. G. (2016). MAOA influences the trajectory of attentional development. *Frontiers in Human Neuroscience*, 10, 424. doi: 10.3389/fnhum.2016.00424
14. Lundwall, R. A., & Dannemiller, J. L. (2015). Genetic contributions to attentional response time slopes across repeated trials. *BMC Neuroscience*, 16, 66.
15. Lundwall, R. A., & \*Watkins, J. K. (2015). Genetic influence on slope variability in a childhood reflexive attention task. *PLOS ONE*, 10(6), e0130668.
16. Lundwall, R. A., Guo, D. C., & Dannemiller, J. L. (2012). Exogenous visual orienting is associated with specific neurotransmitter genetic markers: A population based genetic association study. *PLOS ONE*, 7:e30731.
17. Lundwall, R. A. (2002). Parents' perceptions of the impact of their chronic illness or disability on their functioning as parents and on their relationships with their children. *The Family Journal: Counseling and Therapy for Couples and Families*, 10, 300-307.
18. Lundwall, R. A. (1996). How psychoeducational support groups can provide multidiscipline services to families of people with mental illness. *Psychiatric Rehabilitation Journal*, 20, 64-71.





## Part G: Biographical Sketch

BYU IRB USE ONLY:

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Provide the following information for the Primary Investigator/Research Personnel and other significant contributors in the order listed on the IRB Application, page 1.

Follow this format for each person. **DO NOT EXCEED TWO PAGES PER PERSON.**

### Part A: Basic Information

1. Name Jared Nielsen

2. CITI Username jaredniels

3. Position Title (PI, co-PI, Research Personnel) co-PI

### Part B: Education/Training

Institution and Location	Degree (If applicable)	MM/YY	Field of Study
Brigham Young University, Provo UT	BS	08/2009	Neuroscience
University of Utah, Salt Lake City UT	PhD	12/2013	Neuroscience
University of Utah, Salt Lake City UT	Postdoc	04/2014	Radiology
Harvard University/MGH, Boston/Cambridge MA	Postdoc	07/2018	Psychiatry

### Part C: Research Qualification Statement

During my predoctoral and postdoctoral training, I have worked with and done research on diverse samples with psychiatric and developmental conditions, such as autism spectrum disorder, mood disorders, and anxiety disorders. In addition to my experience working with clinical samples, I have the technical expertise to carry out the proposed research. I have written MATLAB and python scripts that process the temporally dense data that will be collected over time on the individuals. I am also accustomed to acquiring and working with large samples of data, both in terms of the number of participants ( $n \sim 1000$  subjects) and the amount of data collected over time on individuals (up to 9 months of continuous tracking). I am confident the proposed research will result in a

*(Please provide a brief explanation of your training and research experience that qualifies you to conduct the proposed research.)*

### Part D: Relevant Publications

1. Martin-Brevet, S.\*, Rodriguez-Herreros, B.\*, Nielsen, J.A.\*, Moreau, C., Modenato, C., Maillard, A. Pain, A., Richetin, S., Jønh, A.E., Qureshi, A.Y., Zurcher, N.R., 16p11.2 European Consortium, Simons Variation in Individuals Project Consortium, Chung, W.K., Sherr, E.H., Spiro, J.E., Beckmann, J.S., Hadjikhani, N., Reymond, A., Buckner, R.L., Draganski, B., Jacquemont, S. (2018). Quantifying the effects of 16p11.2 CNVs on brain structure: a multi-site 'genetic-first' MRI study. *Biol Psychiatry*, 84(4), 259-264.

2. Travers, B.G., Tromp do, P.M., Adluru, N., Lange, N., Destiche, D., Ennis, C., Nielsen, J.A., Froehlich, A.L., Prigge, M.B., Fletcher, P.T., Anderson, J.S., Zielinski, B.A., Bigler, E.D., Lainhart, J.E., & Alexander, A.L. (2015). Atypical development of white matter microstructure of the corpus callosum in males with autism: a longitudinal investigation. *Mol Autism*, 6, 15.
3. Lange, N., Travers, B.G., Bigler, E.D., Prigge, M.B., Froehlich, A.L., Nielsen, J.A., Cariello, A.N., Zielinski, B.A., Anderson, J.S., Fletcher, P.T., Alexander, A.A., & Lainhart, J.E. (2015). Longitudinal volumetric brain changes in autism spectrum disorder ages 6-35 years. *Autism Res*, 8(1), 82-93.
4. Nielsen, J.A., Zielinski, B.A., Fletcher, P.T., Alexander, A.L., Lange, N., Bigler, E.D., Lainhart, J.E., & Anderson, J.S. (2014). Abnormal lateralization of functional connectivity between language and default mode regions in autism. *Mol Autism*, 5(1), 8.
5. Zielinski, B.A., Prigge, M.B., Nielsen, J.A., Froehlich, A.L., Abildskov, T.J., Anderson, J.S., Fletcher, P.T., Zygmunt, K.M., Travers, B.G., Lange, N., Alexander, A.L., Bigler, E.D., & Lainhart, J.E. (2014). Longitudinal changes in cortical thickness in autism and typical development. *Brain*, 137(Pt 6), 1799-1812.
6. Travers, B.G., Bigler, E.D., Tromp do, P.M., Adluru, N., Froehlich, A.L., Ennis, C., Lange, N., Nielsen, J.A., Prigge, M.B., Alexander, A.L., & Lainhart, J.E. (2014). Longitudinal processing speed impairments in males with autism and the effects of white matter microstructure. *Neuropsychologia*, 53, 137-145.
7. Nielsen, J.A., Zielinski, B.A., Fletcher, P.T., Alexander, A.L., Lange, N., Bigler, E.D., Lainhart, J.E., & Anderson, J.S. (2013). Multisite functional connectivity MRI classification of autism: ABIDE results. *Front Hum Neurosci*, 7, 599.
8. Prigge, M.D., Bigler, E.D., Fletcher, P.T., Zielinski, B.A., Ravichandran, C., Anderson, J., Froehlich, A., Abildskov, T., Papadopolous, E., Maasberg, K., Nielsen, J.A., Alexander, A.L., Lange, N., & Lainhart, J. (2013). Longitudinal Heschl's gyrus growth during childhood and adolescence in typical development and autism. *Autism Res*, 6(2), 78-90.
9. Duffield, T.C., Trontel, H.G., Bigler, E.D., Froehlich, A., Prigge, M.B., Travers, B., Green, R.R., Cariello, A. N., Cooperrider, J., Nielsen, J., Alexander, A., Anderson, J., Fletcher, P.T., Lange, N., Zielinski, B., & Lainhart, J. (2013). Neuropsychological investigation of motor impairments in autism. *J Clin Exp Neuropsychol*, 35(8), 867-881.
10. Trontel, H.G., Duffield, T.C., Bigler, E.D., Froehlich, A., Prigge, M.B., Nielsen, J.A., Cooperrider, J.R., Cariello, A.N., Travers, B.G., Anderson, J.S., Zielinski, B.A., Alexander, A., Lange, N., & Lainhart, J.E. (2013). Fusiform correlates of facial memory in autism. *Behav Sci (Basel)*, 3(3), 348-371.
11. Prigge, M.B., Lange, N., Bigler, E.D., Merkley, T.L., Neeley, E.S., Abildskov, T.J., Froehlich, A.L., Nielsen, J.A., Cooperrider, J.R., Cariello, A.N., Ravichandran, C., Alexander, A.L., & Lainhart, J.E. (2013). Corpus Callosum Area in Children and Adults with Autism. *Res Autism Spectr Disord*, 7(2), 221-234.
12. Froehlich, A.L., Anderson, J.S., Bigler, E.D., Miller, J.S., Lange, N.T., Dubray, M.B., Cooperrider, J.R., Cariello, A., Nielsen, J.A., & Lainhart, J.E. (2012). Intact Prototype Formation but Impaired Generalization in Autism. *Res Autism Spectr Disord*, 6(2), 921-930.
13. Zielinski, B.A., Anderson, J.S., Froehlich, A.L., Prigge, M.B., Nielsen, J.A., Cooperrider, J.R., Cariello, A.N., Fletcher, P.T., Alexander, A.L., Lange, N., Bigler, E.D., & Lainhart, J.E. (2012). scMRI reveals large-scale brain network abnormalities in autism. *PLoS ONE*, 7(11), e49172.
14. Anderson, J.S., Druzgal, T.J., Froehlich, A., DuBray, M.B., Lange, N., Alexander, A.L., Abildskov, T., Nielsen, J.A., Cariello, A.N., Cooperrider, J.R., Bigler, E.D., & Lainhart, J.E. (2011). Decreased interhemispheric functional connectivity in autism. *Cereb Cortex*, 21(5), 1134-1146.
15. Anderson, J.S., Nielsen, J.A., Froehlich, A.L., DuBray, M.B., Druzgal, T.J., Cariello, A.N., Cooperrider, J.R., Zielinski, B.A., Ravichandran, C., Fletcher, P.T., Alexander, A.L., Bigler, E.D., Lange, N., & Lainhart, J.E.

(2011). Functional connectivity magnetic resonance imaging classification of autism. *Brain*, 134(Pt 12), 3742-3754.

## Quinn O. Snell, PhD

Professor, Computer Science Department  
Brigham Young University

### Education

Ph.D.	Computer Science	1997	Iowa State University  Dissertation: <i>Parallel Hierarchical Global Illumination</i> Advisor: John L. Gustafson
M.S.	Computer Science	1993	Utah State University  Research: Fault Tolerant Message Passing
B.S.	Computer Science	1992	Utah State University

### Publications

- "The OGCleaner: filtering false-positive homology clusters", S. Fujimoto, A Suvorov, N. Jensen, M. Clement, Q. Snell, *Bioinformatics*, vol 33 Number 1, pp 125-127
- "ScaffoldScaffolder: solving contig orientation via bidirected to directed graph reduction", P. Bodily, S. Fujimoto, M. Clement, Q. Snell, D. Ventura, *Bioinformatics*, doi 10.1093/bioinformatics/btv548
- "Heterozygous genome assembly via binary classification of homologous sequence", M. Clement, Q. Snell, P. Bodily, S. Fujimoto, C. Ortega, N. Okuda, J. Price, *BMC Bioinformatics* 2015 16(Suppl7):S5
- "Effects of error-correction of heterozygous next-generation sequencing data", M. Stanley Fujimoto, Paul Bodily, Nozomu Okuda, Mark J Clement and Quinn Snell, *BMC Bioinformatics* 2014 15(Suppl 7):S3 doi 10.1186/1471-2105-15-S7-S3
- "Probabilistic alignment leads to improved accuracy and read coverage for bisulfite sequencing data", Changjin Hong, Nathan L Clement, Spencer Clement, Saher Sue Hammoud, Douglas T Carrell, Bradley R Cairns, Quinn Snell, Mark J Clement and William Evan Johnson, *BMC Bioinformatics*, 2013, 14:337, doi:10.1186/1471-2105-14-337
- "Pathoscope: Species Identification and Strain Attribution with Unassembled Sequencing Data", Owen E. Francis, Matthew Bendall, Solaiappan Manimaran, Changjin Hong, Nathan L. Clement, Eduardo Castro-Nallar, Quinn Snell, G. Bruce Schaalje, Mark J. Clement, Keith A. Crandall, W. Evan Johnson, *Genome Research*, 2013, doi: 10.1101/gr.150151.112
- "Probabilistic Inference and Ranking of Gene Regulatory Pathways as a Shortest-Path Problem", James D. Jensen, Daniel M. Jensen, Mark J. Clement, Quinn O. Snell, *BMC Bioinformatics* 2013, 14(Suppl 13):S5 doi: 10.1186/1471-2105-14-S13-S5

- “Compiler Acceleration of Accelerator Data Transfers”, D. Penry, M. Ashcraft, A. Lemon, Q. Snell, Workshop on High-Level Programming for Heterogeneous and Hierarchical Parallel Systems, Jan 2017
- “GNUMAP 4.0: Space and Time Efficient NGS Read Mapping Using the FM-Index”, M. Clement, Q. Snell, C. Lyman, S. Fujimoto, P. Bodily, Proceedings of the International Biotechnology and Bioinformatics Conference, Dec. 2016
- “A Structured Approach to Ensemble Learning for Alzheimer’s Disease Prediction”, M. Seeley, M. Clement, C. Giraud-Carrier, Q. Snell, P. Bodily, S. Fujimoto, J. Kauwe, P.G. Ridge. In Proceedings of the 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics, pp. 605-606. ACM, 2014.
- “Haplotype-Centered Mapping for Improved Alignments and Genetic Association Studies.”, P.M. Bodily, M.J. Clement, Q. Snell, M.S. Fujimoto, P.G. Ridge. In Proceedings of the 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics, pp. 499-505. ACM, 2014.
- “HapMaker: Synthetic Haplotype Generator”, Nozomu Okuda, Paul Bodily, Jared Price, Mark Clement, Quinn Snell, Proceedings of the 14<sup>th</sup> International Conference on Bioinformatic and Computational Biology (BIOCOMP ’13), July 2013
- “Identification and correction of substitution errors in Moleculo reads”, Jared Price, Mark Clement, Quinn Snell, Evan Johnson, Proceedings of the 13th IEEE International Conference on Bioinformatics and Bioengineering (IEEE BIBE 2013), October 2013
- “Application of a MAX-CUT Heuristic to the Contig Orientation Problem in Genome Assembly”, Paul Bodily, Mark Clement, Jared Price, Stanley Fujimoto, Nozomu Okuda, Quinn Snell, Lyman Cole, Proceedings of the 13th IEEE International Conference on Bioinformatics and Bioengineering (IEEE BIBE 2013), October 2013
- “Denovo Identification of "Heterotigs" towards Accurate and In-phase Assembly of Complex Plant Genomes”, Jared C. Price, Paul Bodily, Quinn Snell, Mark Clement, Proceedings of the 2012 International Conference on Bioinformatics and Computational Biology (BIOCOMP '12), July 2012

## Projects Relevant to Grant

- |                |  |
|----------------|--|
| 2015 – present | Collaborated with Christophe Giraud-Carrier on Big Data Capstone<br>This class teaches Big Data Analysis concepts and connects groups of students with external companies doing real Big Data projects |
| 2010 – 2011    | Sabbatical at General Electric Global Research<br>Research in Parallel Processing for scientific applications and Big Data   |



## Part G: Biographical Sketch

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### Part A: Basic Information

1. Name
2. CITI Username
3. Position Title (PI, co-PI, Research Personnel)

### Part B: Education/Training

Institution and Location	Degree (If applicable)	MM/YY	Field of Study
University of Central Lancashire	PhD	05/2004	Psychology

### Part C: Research Qualification Statement

I have been a professor for over ten years. In that time, I have conducted and published dozens of research studies.  
(Please provide a brief explanation of your training and research experience that qualifies you to conduct the proposed research.)

### Part D: Relevant Publications

Coyne, S. M. (in press). Effects of viewing relational aggression on television on aggressive behavior in adolescents: A three-year longitudinal study. *Developmental Psychology*.

Coyne, S. M., Callister, M., Gentile, D. A., & \*Howard, E. (in press). Media violence and judgments of offensiveness: A quantitative and qualitative analysis. *Psychology of Popular Media Culture*.

Coyne, S. M., Linder, J. R., Rasmussen, E. E., Nelson, D. A. & \*Birkbeck, V. (in press). Pretty as a princess: Longitudinal effects of engagement with Disney Princesses on gender stereotypes, body image, and prosocial behavior in children. *Child Development*.

McDaniel, B. T. & Coyne, S. M. (in press). "Technoference": The interference of technology in couple relationships and implications for women's personal and relational well-being. *Psychology of Popular Media Culture*.

Padilla-Walker, L. M., Coyne, S. M., & Collier, K. M. (in press). Longitudinal

Anderson, C. A., Andrighetto, L., Bartholow, B. D., Beague, L., Boxer, P., Brockmyer, J. F., Burgess, M. C. R., Calvete, E., Cantor, J., Coyne, S. M., Dill-Shackleford, K., Donnerstein, D., Gabbiadini, A., Gibson, B., Hasan, Y., Lueke, A. K., Orue, I., Riva, P., Strasburger, V. C., Volpato, C., & Warburton, W. (2015). Consensus on media violence effects: Comment on Bushman, Gollwitzer, and Cruz. *Psychology of Popular Media Culture*, 4, 215-221.

Coyne, S. M., Callister, M., \*Stockdale, L., \*Coutts, H., & \*Collier, K. M. (2015). "Just how graphic are graphic novels?" An examination of aggression portrayals in manga and associations with aggressive behavior in adolescents. *Violence and Victims*, 30, 208-224.

Coyne, S. M., Dyer, W. J., \*Densley, R., \*Money, N. M., Day, R. D., & Harper, J. M. (2015). Physiological indicators of pathological video game use in adolescence. *Journal of Adolescent Health*, 56, 307-313.

Coyne, S. M., & Padilla-Walker, L. M. (2015). Sex, violence, & rock n' roll: Longitudinal effects of music on aggression, sex, and prosocial behaviour during adolescence. *Journal of Adolescence*, 41, 96-104.

Padilla-Walker, L. M., Coyne, S. M., Collier, K. M., & Nielson, M. G. (2015). Longitudinal relations between prosocial television content and adolescents' prosocial and aggressive behavior: The mediating role of empathic concern and self-regulation. *Developmental Psychology*, 51, 1317-1328. <http://dx.doi.org/10.1037/a0039488>

Padilla-Walker, L. M., Dyer, W. J., Yorgason, J. B., \*Fraser, A. M., & Coyne, S. M. (2015). Adolescents' prosocial behavior toward family, friends, and strangers: A person-centered approach. *Journal of Research on Adolescence*, 25, 135-150.

Stockdale, L., Coyne, S. M., Nelson, D. A., & \*Erickson, D. (2015). Borderline personality disorder features, jealousy, and cyberbullying in adolescence. *Personality and Individual Differences*, 83, 148-153.

Barlett, C., & Coyne, S. M. (2014). A meta-analysis of sex differences in cyber-bullying behavior: The moderating role of age. *Aggressive Behavior*, 40, 474-488.

Coyne, S. M., Linder, J. R., Rasmussen, E. E., Nelson, D. A., & \*Collier, K. M. (2014). It's a bird! It's a plane! It's a gender stereotype!: Longitudinal associations between superhero viewing and gender stereotyped play. *Sex Roles*, 70, 416-430.

Coyne, S. M., Padilla-Walker, L. M., \*Fraser, A. M., \*Fellows, K., & Day, R. D. (2014). "Media time = family time": Positive media use in families with adolescents. *Journal of Adolescent Research*, 29, 663-688.

Coyne, S. M., Padilla-Walker, L. M., Harper, J., Day, R. D., & \*Stockdale, L. (2014). A friend request from dear old dad: Associations between parent/child social networking and adolescent outcomes. *Cyberpsychology, Behavior, and Social Networking*, 17, 8-13.

Nelson, D. A., Coyne, S. M., \*Swanson, S. M., Hart, C. H., & Olsen, J. A. (2014). Parenting, relational aggression, and borderline personality features: Associations over time in a Russian longitudinal sample. *Development and Psychopathology*, 26, 773-787.

Coyne, S. M., Padilla-Walker, L. M., & \*Howard, E. (2013). Emerging in a digital world: A decade review of media use, effects, and gratifications in emerging adulthood. *Emerging Adulthood*, 1, 125-137.

## Melissa A. Heath

**Short BIO:** Melissa A. Heath, PhD, Professor in Brigham Young University's School Psychology Program, researches school-based crisis intervention, children's grief, and bibliotherapy that addresses children's social emotional needs. Dr Heath makes information practical and easy to implement across settings.

Professor, Brigham Young University  
Department of Counseling Psychology and Special Education  
340 K MCKB Provo, UT 84602-5093  
[melissa\\_heath@byu.edu](mailto:melissa_heath@byu.edu) 801-422-1235(w) 801-372-5407(c)

**Credentials:** Licensed Psychologist (UT); Nationally Certified School Psychologist (NCSP); Licensed School Psychologist (UT)

### Educational History

Brigham Young University	Texas A&M University
Major: Psychology	Major: School Psychology
Degree: BS Cum Laude, 1975	Degree: PhD 1996 (December)
Honors: Presidential Scholarship	Honors: Texas A&M Regents Fellowship

### Professional Positions

1991–1999	Worked in public schools and community agencies in TX, providing mental health support for children and families (Bryan ISD, TX & Hurst-Euleless-Bedford ISD, TX)
1999–present	Brigham Young University Department of Counseling Psych & Special Education
1999–2004	Assistant Professor; 2005–2017 Associate Professor; 2017–present Full Professor

### Scholarly and Professional Service: Editorial Boards

*Psychology in the Schools; Professional Psychology: Research and Practice; Journal of School Violence; School Psychology International; School Psychology Review; Utah School Psychology Observer*

### Professional Leadership and Service

2000–present	HOPE4UTAH Suicide Prevention Conference Planning Committee
2004–2007; 2014–2017	BYU School Psychology Program Coordinator
2007–2008	Leader of the NASP Crisis Intervention Interest Group (464 members)
2006–2007	NASP National School-Based Crisis Intervention Planning Committee
2008–2014	NASP National Review Board for NCSP (National Licensing)
2010–2012	NASP Conference Committee: Submissions Review Team
2014–present	President of the Board of Directors for HOPE4UTAH Suicide Prevention
2015–present	UT Association of School Psychologists; Executive Board Trustee
2016–present	Director of BYU Building Social Skills with Bibliotherapy Website
2017–present	NASP Trainers of School Psychologists' (TSP) Executive Board
2018–present	Leader of NASP Bibliotherapy Interest Group
2017–present	Reviewer for APA Division 16 Conference Proposal Submissions
2016–present	Reviewer for NASP Annual Convention Proposal Submissions

### Honors and Awards

2004, 2007, & 2014	BYU School Psychology Professor of the Year Award, Awarded by School Psychology Students
2008	Vickie Cottrell Hope Award for Utah's Suicide Prevention Efforts
2013	BYU Wesley P. Lloyd University Award for Distinction in Graduate Education
2015	Student Mentoring Award, BYU Women's Faculty Association
2015–2016	Wasatch Elementary (Provo, UT) School Friend of Education
2016	Utah Association of School Psychologists Lifetime Achievement Award

### Selection of Recent Publications Related to Understanding the Social Emotional Needs of Youth

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### **Recent Funding History**

*Duplicates among team members removed*

#### **Terisa Gabrielsen**

2018-2020 -- \$62,100

Special Education Personnel Preparation Interagency Agreement Grant, Utah State Board Education, Co-PI w/ Ellie Young

*Putting Utah First: Keeping School Psychologists in Utah and Increasing Fully Trained, Highly Effective School Psychologists in Utah's Rural School Districts*

2018 -- \$5,130

McKay School of Education Experiential Learning Grant, PI

*Ethically Building Capacity for Autism Assessment in Schools* (ADOS training for CPSE graduate clinicians)

2018 -- \$11,720 + \$3,200 mini-grant

McKay School of Education Experiential Learning Grant, BYU, PI

*Helping Secondary Students with Emotional Disorders to be Successful in the Classroom*

2017 -- \$40,000

McKay School of Education Research Grant, \$40,000, BYU, PI

*Online, Real Time, Interactive Social Skills Interventions for Students with Autism Spectrum Disorder in Rural and Other Underserved Areas*

2016 -- \$20,000

BYU Mentored Environment Grant, BYU, PI

*Connecting More than Just Peers: A Research and Community Partnership*

2015-2016 -- \$10,000

MRI Research Initiation Grant, BYU MRI Research Facility, PI

*Functional Connectivity in Low Functioning Individuals Diagnosed with Autism Spectrum Disorder*

#### **Mikle South**

2019-2021 -- \$20,000

Multi-modal investigation of sleep dysfunction and anxiety in autistic adults. Source: BYU MEG grant.

Role: Co-Investigator with Daniel Kay, Department of Psychology.

2014-2016 -- \$66,000

Improving the lives of children with autism and their families through interdisciplinary research, training, and community partnerships. Source: BYU McKay School of Education. Co-PI with Terisa Gabrielsen, Blake Hansen

2016 -- \$3,000

Mindfulness treatment for anxiety and alexithymia in adults diagnosed with autism spectrum disorder.

Source: BYU FHSS Role: Co-PI, Jon Cox

**Carl Hanson and Michael Barnes**

FUNDED RESEARCH/GRANTS: (Total Funded at BYU: \$1,029,379 – Externally Funded: \$870,492)

2017 – 2021 -- \$38,670

Drug-free Communities Grant; SAMHSA through Utah County Department of Drug and Alcohol Prevention. Giraud-Carrier, C., Hanson, C. & Barnes, M. 12/2017-2021

2015 –2016 -- \$10,415

iKeepSafe; externally funded. A Computational Health Science Assessment of Adolescent Unwanted Online Experience, Hanson, C., Barnes, M., Giraud-Carrier, C. 7/2015-2/2016

**Jon Cox and Rebecca Lundwall**

2017 – 2018 -- \$19,938

BYU Office of Research and Creative Activities Mentoring Environment Grant —2017-2018 For Lundwall, R. A. & Cox, J. C. (2017-2018). *Unseen, but in Plain Sight: Identifying Developmental Patterns of Females with Symptoms of Autism Spectrum Disorder*.

**Jared Nielsen**

2018 -- \$3,700

BYU private donor