

11 PSYCHOLOGY AUTISM SPECTRUM DISORDER POSTER TASK 2015 - MARKING KEY

Research booklet

Describe what Autism CRC is

The Cooperative Research Centre for Living with Autism Spectrum Disorders is the world's first national, cooperative research effort focused on living with autism, attracting world-renowned researchers to meet the challenge. The research program is end-user driven from needs definition through conduct to implementation and evaluation of outcomes. Founded in 1990, Autism CRC brings together researchers, industry, and health and education service providers together with people with the lived experience of autism at the centre of their activities.

Program 1: Diagnosis Project: Family Support Program

La Trobe University

The diagnostic process for Autism Spectrum Disorder (ASD) can be a difficult and overwhelming time for families. Although the long term effects of diagnosing children at an early age are positive, parents may not necessarily feel prepared for the initial diagnosis. A Family Support Program (FSP) will be developed and tested in conjunction with the Social Attention and Communication Surveillance (SACS) program (Project 1.005). It is expected that the majority of children identified via the SACS will meet criteria for an ASD (81%; Barbaro & Dissanayake, 2010), whilst the remaining children will be identified as showing other developmental delays/disorders. The current study will develop and investigate the impact of the FSP for families of newly diagnosed children with ASD. In doing so it aims to identify and understand the unique needs of parents in this critical post-diagnosis period. FSP outputs will be utilised by diagnosticians and allied health professionals, to more effectively guide parents following their child's ASD diagnosis, and the materials developed as part of the FSP will be made available on the Autism CRC ASD Hub Connect.

Program 1: Diagnosis Functional Genomic Studies of ASD

University of New South Wales, The University of Queensland

Post mortem brain tissue from autistic individuals are a rare resource, due to the relatively recent initiative of brain tissue archiving for ASD world-wide. At the same time, the use of human brain tissue is immensely valuable for investigating the molecular basis of brain disorders. The rapid advance of systems biology approaches makes it now possible to tackle the complexity of genetic variation and gene expression in the brain, by simultaneously investigating genetic changes and their functional consequences on mRNA expression. We are currently generating genome-wide expression data from 100 postmortem brain samples from ASD cases and controls already available in Dr. Voineagu's lab. We propose to make these data available to the CRC researchers and request funding for bioinformatics analyses integrating the RNA-seq data with the exome-sequencing data generated by CRC program 1.

Program 1: Diagnosis Project: Developmental Surveillance for autism

La Trobe University, University of New South Wales

Our objective is to train community-based primary care professionals (including Maternal and Child Health, paediatricians, GPs, allied health staff and early childhood educators) across four states to prospectively identify infants and toddlers developing ASD during their routine assessments of young children at 12-, 18- and 24-months of age. This will be achieved by implementing the revised Social Attention and Communication Surveillance (SACS-R) program at these ages in a well define catchment area within each state. Infants and toddlers identified as at risk of ASD (expected at 1:100) will be assessed at 6-monthly intervals until 24-months, and again at 36 months of age in UWA and LTU as a means of evaluating the success of the program in prospectively identifying children with an ASD. Those identified in NSW and QLD will be referred to a community-based paediatrician/diagnostic service as standard practice, without further follow-up. It is expected that implementation of the SACS at all sites, and follow-up of referrals at two sites, will result in the correct diagnosis of at least 50% of children with ASD to before 2-years and at least 70% by 3-years. Early identification and diagnosis will result in earlier access to relevant early intervention programs therefore maximizing developmental outcomes for affected children and their families.

Program 1: Diagnosis**Project: Autism Subtyping Project**

University of New South Wales, La Trobe University, The University of Queensland

This project aims to help match children with the intervention that works best for their biological make-up. While we know that early intervention enhances developmental outcomes for children with autism, we hope to find homogeneous subgroups in order to receive targeted and therefore more effective, early intervention. Over the past three decades, significant data has emerged suggesting that programs beginning in infancy and toddler years have the potential to affect key outcomes for children with ASD and the earlier the intervention, the better the outcome. However, there is only limited evidence on the determinants of such outcomes from the perspectives of individual clinical and associated neurobiological and family/psychosocial characteristics. This study will evaluate the child characteristics and associated clinical, neurocognitive, family and psychosocial and genetic determinants of early intervention outcomes in ASD with a view of finding homogeneous subgroups that will predict the neurodevelopmental trajectory and outcome. Proposed sub-projects will aim to: Study the predictors of developmental and treatment outcomes by profiling children (clinical, family/psychosocial and neurocognitive) at baseline and at the end of one year of early intervention program. Study intervention variables, family, psychosocial and quality of life factors as mediators of outcomes. Study the clinical profile (phenotype), and neurocognitive correlates (endophenotypes) of intervention outcomes to determine homogeneous subgroups. The results from this study will link with the outcomes from genetic profiling and followed up for developmental trajectory and outcomes and for refining and validating the subtypes in collaboration with programs 2 and 3. Significance: This study will be the first to implement prospective longitudinal functional brain imaging as a marker of early intervention outcome and the first to incorporate functional brain imaging with phenotypic and genotypic characterisation with a view to determine subgroups that predict treatment response in preschool children with ASD.

Program 1: Diagnosis**Project: BrainsTorm Study**

The University of Queensland

This study will use cutting edge technology to transform white blood cells into brain-like cells, which can then be used as a cell model to identify cellular abnormalities in individuals with autism. The reasoning behind analyses of neurological cells is to improve the chances of detecting abnormalities related to autism. Regardless of cause, the disability is manifest in abnormal function of neurological cells, so these are the logical cells for the study. Clearly, neurological tissue is not readily obtainable, so neurological cells generated from blood samples taken from autistic individuals, will be used as a surrogate. Human induced pluripotent stem (iPS) cells are emerging as potential cellular models to recapitulate perturbed steps in neurodevelopment that lead to neuropathy. To date, neurological diseases modelled with iPS cells include schizophrenia, Rett's syndrome, Huntington's disease, spinal muscular atrophy and Parkinson's disease. Using established protocols, we will generate iPS cells for use as a cell model of autism. Our approach will lead to the co-culture of neuron and glial cells, which reflects the bidirectional communication between neurons and glial cells, as well as the functional role of glial cells in supplying metabolites, nutrients and growth factors to neighbouring neurons. We acknowledge the limitations of interpreting the outcomes of this study to the in vivo situation but stress that similar iPS cell studies have provided suitable models of certain neurological diseases, as well as providing cellular models for therapeutic drug testing.

Project 2: Education**Project: Creation of the first Australian Autism Biobank**

University of Western Australia, University of New South Wales, La Trobe University

Autism CRC is creating Australia's first and largest autism Biobank. The Biobank will contain detailed biological information collected from over 1200 families where a family member has autism. This will allow for the first time, on an unprecedented scale, a genetic discovery that we've never seen before in Australia and allow for earlier and more accurate diagnosis. The aim of the current study is to establish an Australian autism biobank by collecting detailed phenotypic and genotypic information on cases of ASD from four Essential participants, each in different states. Children with ASD (2 - 17 years of age) will be recruited through therapy service providers and existing research databases in each state. Parents will contact their local site to enrol in the study. Parents will be asked to complete questionnaires regarding the medical and social history of the family. The family will then be invited on to their local study site for behavioural testing of the child. Blood will also be obtained from the child as well as the biological mother and father. Biological samples will then be shipped to the The Ventyx WSARI Tissue Bank at the Wesley Hospital Brisbane for the creation of a biobank and long-term storage. This project is an essential element of Program 1 as the data obtained will provide the biological and phenotypic information for the genetic and biochemical analyses in Project 1.2.

Program 2: Education Project: Autism, Anxiety and Schools

Curtin University of Technology, University of Western Australia

This project will complete a comprehensive investigation into the degree to which reducing anxiety leads to improvements in school functioning. It is predicted that engaging in a group anxiety program will improve school behaviour and academic outcomes. However, these children typically have poor school experiences and outcomes, with their social difficulties and challenging behaviours particularly evident in this setting. Children with ASD also commonly experience high levels of anxiety which are likely to exacerbate social and academic difficulties in the school setting. Surprisingly, there is yet to be a comprehensive investigation of the degree to which reducing anxiety leads to improvements in school functioning. The first aim of the project is to investigate whether participation in a group anxiety program assists ASD children to function better at school. As well as substantially reducing anxiety, completing the anxiety program is predicted to lead to gains in school behaviour (i.e., improved social functioning, reduced challenging behaviour, enhanced school enjoyment) and better academic outcomes (i.e., increased attendance and grades). As school is a major source of anxiety for many ASD children, creating a program that directly involves the teacher may enable strategies to be implemented more successfully at school.

The second aim of the project is to examine whether incorporating a teacher component into an anxiety program extends the benefits of the standard program. It is predicted that adding the teacher component will result in greater reduction in anxiety, and better school functioning, relative to the standard anxiety program with no formal involvement of teachers.

Program 2: Education Project: Improving Classroom Acoustics

The University of Queensland

This study will test the extent to which Sound Field Amplification systems in classrooms assist students with ASD to process information and follow instructions. The introduction of these systems is expected to assist all children including those with ADHD, language disorders, hearing impairments and students for whom English is a second language. As they process sensory input differently, students with ASD often find the noise of classrooms overwhelming. In particular, these students have consistently been found to have significant deficits in processing of speech in noise, which impacts on their capacity to follow their teacher's instructions in noisy classrooms (Alcantara et al., 2004, 2012; Rance et al., 2013; Schafer et al., 2013). Schafer et al. (2013) found the mean speech-in-noise perception capacity of students with ASD and ADHD to be less than half that of typically developing students. Two studies conducted in special education classrooms indicated that improved acoustics can significantly improve attention and reduce response times in children with ASD (Kinnealey et al., 2012; Mostafo, 2008). Recent studies have explored the classroom use of frequency modulation (FM) systems (devices that include a small receiver in the student's ear and a transmitter and microphone worn by the teacher) with the aim to improve the perception of the teacher's verbal instructions. The researchers will make recommendations on classroom acoustics to the facilities management and assistive technology sections of educational authorities, based on the outcomes of this study. This study will enable schools to make evidence-informed decisions about investments in improvements to classroom acoustics.

Program 2: Education Project: Emergent Literacy in Children on the Autism Spectrum

Griffith University

This project will examine emergent literacy development in preschool children with ASD to determine whether children with ASD require specific early intervention strategies. This will provide direction for early intervention and may ultimately lead to greater academic success. There has been a distinct lack of attention to the educational supports and outcomes of children with ASD once they reach school, including factors that predict and maintain learning advantage and disadvantage and strategies to support students, parents, and teachers (Autism Spectrum Australia, 2013). Most striking is the lack of research examining early literacy development in children with ASD, known as emergent literacy, given that learning to read and write for meaning is widely accepted as the cornerstone of academic success for all children, including those with ASD (Catts, Fey, Zhang, & Tomblin, 2001). Therefore, our overall objective in this project is to measure and identify factors that predict emergent literacy skills in children with ASD before they transition to school to provide direction for early intervention to help optimise academic success. Specific aims are: 1. To determine if the emergent literacy skills of children with ASD differ to those of typically developing children. 2. To determine the impact of factors (i.e., home literacy environment, ASD symptomology, age, general communication skills) on children's emergent literacy development. 3. Based on these findings, to determine whether children with ASD require ASD-specific strategies for promoting emergent literacy development.

Program 2: Education**Project: Longitudinal Study of Australian students with Autism**

Griffith University, Queensland University of Technology, The University of Sydney

This study will follow children with autism over a six year period, collecting information about strengths and difficulties in a range of areas. Our research will find out which factors improve or impede a child's participation and improve their academic performance in order to develop tools and strategies to better assist their development.

A study of the developmental and behavioural trajectories of children with ASD focusing on the relationship of child characteristics, type and amount of intervention and participation in school, educational placement, social, behavioural and academic outcomes, will help us to answer key research questions. The initial goal of this project (deliverable 1) is to develop and trial a suite of assessment tools in collaboration with referring agencies, to describe child and family participants and effectively assess change over time for a range of outcomes including cognition, language and behavioural characteristics; plus demographic and school intervention data. The overall aim of the project is to determine the relationship, if any, between child/family characteristics, their experiences of intervention and school support and the child developmental and behavioural trajectories. T

Program 2: Education**Project: Australian Educational Needs Analysis**

Griffith University, Queensland University of Technology, The University of Queensland

This project will help shape the future with a landmark national analysis of the educational needs of students aged 5-18 years with ASD. We are calling on school administrators, teachers and specialist support staff, ancillary support staff such as teacher aides, parents of students with ASD and students with ASD to share their experiences. This study has now closed and results will be available shortly. Students with ASD present unique challenges to school systems. The Australian ASD Educational Needs Analysis (ASD-ENA) project aims to produce the first Australian wide needs analysis of students with ASD (aged 5-16 years) and their educational needs. Using a mixed methods approach the needs analysis will use an Australian wide survey to obtain information from the 5 key stakeholder groups regarding the range of educational needs they identify students with ASD (5-16 years) as having within school settings. A specific focus of the analysis will also be to identify the more specific educational supports students with ASD with high impact social, emotional, behavioural and complex needs may present with. The survey will be followed up with the collection of more in depth qualitative data from focus groups with the 5 key stakeholder groups.

Program 2: Education**Project: Robotics Social Club**

Queensland University of Technology

This project will develop a resource kit and manual to support teachers to implement the successful Robotics Social Club program. During 2014, Robotics Social Clubs were initiated by Brisbane Catholic Education staff to specifically address the issues associated with building the pro-social learning skills of students verified as having Autism Spectrum Disorders (ASD). The impetus for this approach by BCE was in response to the frustration of educators identifying often subtle gains made by students when attending targeted clinical social skills interventions outside of the school environment. In addition, social skills reportedly acquired by these students within the intervention contexts did not appear to generalise to the school-learning environment. Robotics Social Clubs focus on the strengths and interests of some students with ASD (rather than their deficits) and are organised after school or during school lunch times to support students (aged 12-13 years) to work on robotics challenges over 12 one hour sessions (once a week).

Program 2: Education**Project: Secret Agent Society whole classroom trial**

The University of Queensland

This project will be extending the Secret Agent Society program from a small group context into a whole classroom model. This will broaden the reach of the highly successful, evidence-based program and help more children with ASD and their families. The aim of the Secret Agent Society (SAS) whole classroom project is to trial a programme that fits within the grade 6 curriculum and teaches skills in emotion recognition and emotion regulation, friendship building and social skills (talking and playing with others), as well as organisation and planning skills and skills to boost children's self-esteem and respect individual differences. The SAS programme takes a strengths-based approach to foster learning. A randomised controlled trial design will initially be used to evaluate efficacy of the programme followed by collection of further data to evaluate effectiveness across states. The expected outputs include training of up to 40 teachers in the programme and provision of materials for 20 classrooms. Once trained teachers are encouraged continue to use the programme and we anticipate that the supervision provided will increase the likelihood that the resource will be sustained beyond the life of the project.

Program 2: Education**Project: Helping students stay on task and move between tasks**

Griffith University, Queensland University of Technology

Children with autism tend to need support getting started on tasks, finishing tasks and transitioning between tasks. This project will research interventions which will be easy to implement for the teacher, make a real difference for a child with autism and potentially benefit the whole class. Students with ASD experience attention difficulties, including overly narrow selective attention on information that may not be relevant. Executive function difficulties limit their capacity for planning and organisation. Because these students lack the flexibility, they often have great difficulty transitioning from one educational task to another, and may react to transitions with behavioural "meltdowns", which are highly distressing for the child themselves, the teacher and other students. Structured approaches such as TEACCH (Treatment and Education of Autistic and Related Communication Handicapped Children; Mesibov and Shea, 2010) can facilitate engagement in learning, and transitions between learning tasks. The physical layout of the classroom environment is organised to provide greater visual clarity with reduced clutter. Work systems inform the student about "what to do", "how long for", "when the task is finished", and "what happens next".

Program 2: Education**Project: Overcoming Difficulties with Written Expression**

Queensland University of Technology

In this project, the use of assistive technology in combination with explicit writing strategy instruction in mainstream classrooms will be evaluated. The aim is to develop software that will benefit all children in a classroom. Previous research has consistently found that students with ASD have both difficulty handwriting and challenges in the conceptual aspects of written composition (Harbison & Alexander, 2009; Kushki et al., 2011). In this project, the use of assistive technology in combination with explicit writing strategy instruction in mainstream classrooms will be evaluated. It is anticipated that the SRSD explicit writing instructions strategy will be taught to all students, and that assistive technology will also be made available to other students who would benefit from their use (e.g., students with other support needs such as cognitive, language or fine motor difficulties that impede the capacity to write). A series of multiple single subject experimental design (ABAC) studies will be used (A = baseline using handwriting, B = use of assistive technology for writing selected through SETT framework (e.g., word processing with word prediction, or speech recognition software), C = use of assistive technology in combination with the use of SRSD. Student surveys will be used to gain their perceptions of the social acceptability and ease of use of assistive technology and SRSD strategies.

Program 3: Adulthood**Project: The Australian Longitudinal Study of Adults with Autism spectrum conditions**

Curtin University, The University of Queensland, La Trobe University, University of New South Wales

This longitudinal study is one of two comprehensive studies of Australian adults with autism. This study will follow 160 adults with autism, 25 years or older, over four years and document outcomes on productivity, physical and mental health, well-being, and societal participation. A comprehensive and unique profile of Australian adults with autism will be documented through two longitudinal studies. This project aims to: Identify a profile of the health, wellbeing and participation of adults with autism. Collect data that will support the development of tools and strategies to improve health and wellbeing for adults with autism. Identify autism specific variables to inform the development of STEP-A and IEST employment tools

Program 3: Adulthood**Project: Career Pathway recommender system**

Curtin University

This project will transfer the STEP-A vocational tool into an online platform to automatically match personal attributes to education and career pathways. The aim of the project is to develop an Autism Spectrum Disorder Career Recommender System (ACRS) software application for young people with autism. This software will assist high school students with autism with their career planning from Year 11 onwards. The system is a software realisation of the STEP-A project which allows users to specify their strengths and areas of interest, and then recommends suitable pathways for further education and employment. Central to the system is the use of Intelligent Agent and Machine Learning technologies which will be used to automatically match personal attributes to education and career pathways.

Program 3: Adulthood Project: Development of vocational and employment success tools

Curtin University, The University of Queensland, La Trobe University, University of New South Wales, University of Western Australia, University of Queensland

People with autism have a very high rate of unemployment or underemployment. By developing the Successful Transition to Employment Protocol - Autism Spectrum Conditions (STEP-A) and the Integrated Employment Success Tool (IEST) we aim to help more people with autism find paid employment and therefore improve their overall wellbeing. The majority of people with autism typically have difficulties transitioning into, or completing higher education/vocational training, and transitioning to employment without support. While the transition to employment is difficult, if jobs are found, people with autism are often highly appreciated by their employers for their trustworthiness, reliability and low absenteeism. Some employees with autism demonstrate strengths in their focus and meticulous attention to details. Workplace difficulties for people with autism originate more often from social, communicative and cognitive challenges than actual job performance. The lack of effective transition planning, adult support services and policies that address the characteristics and needs of people with autism in Australia have contributed to poor post-school outcomes. However, with optimal education/training and workplace adaptations, people with autism can pursue a range of occupations.

Program 3: Adulthood Project: Enhancing health and wellbeing in adults with autism

Curtin University, The University of Queensland, La Trobe University, University of New South Wales

This project aims to enhance health and wellbeing in adults with autism and their families. It focuses on the identification and management by general practitioners, psychiatrists and other mental health professionals, of the physical and mental health issues frequently associated with autism. Program 3 aims to directly facilitate paths towards fulfilling lives for adults with autism and their families. This project aims to enhance health and wellbeing in adults with autism and their families. It focuses on the identification and management by general practitioners, psychiatrists and other mental health professionals, of the physical and mental health issues frequently associated with autism. The interventions developed and the outcomes of this Project will be informed by the longitudinal study of adults with autism, which will track over four years (this application concerns the three first years) the physical and mental health, wellbeing, life roles, time use, satisfaction, employment, community access and participation of adults.

Program 3: Adulthood Project: Peer mentoring and enhancing the social relationships of young adults with autism

Curtin University, University of Western Australia

This project will undertake two interlinked research studies. Study one will develop, implement and evaluate a peer mentoring program for young adults with autism in higher education. Study two will develop computer-based social-emotional training intervention with a brain-computer interface. This project will undertake two interlinked research studies. Study one will develop, implement and evaluate a peer mentoring program for young adults with autism in higher education. Study two will develop computer-based social-emotional training intervention with a brain-computer interface. Participants from the first study will inform the development of the intervention in the second. In study 1, the Curtin Specialist Mentoring Program (CSMP), will be evaluated and a module for mentoring programs with young adults with autism and disability support workers developed, and implemented, at the University of Western Australia, Curtin University, as well as an online e-mentoring program. The preliminary effectiveness of this module in these three contexts will then be evaluated using a pre-test post-test design with 36 university students with autism. Study 2 addresses the development of social relationship modules based on previous research. The aim of this study is to develop an emotion recognition training intervention, delivered via two mediums to adolescents and young adults with autism in a randomised controlled trial.

Program 3: Adulthood Project: Recruitment and retention of adults with autism in longitudinal studies

Curtin University, The University of Queensland, La Trobe University

This project aimed to understand the most effective methods of recruitment and retention of adults for autism research. This project is now complete. Recruitment and retention of adults with autism is likely to pose some difficulties in the two longitudinal studies that are core elements of research Program 3: Finding a place in Society. It is anticipated that there will be significant challenges in recruiting and retaining the autism participants. The two longitudinal studies will largely be based on survey tools, in questionnaire formats. There is literature to suggest that offering incentives to completion of questionnaires can be successful in motivating individuals to initially complete questionnaires and also to continue to participate in research.

Program 3: Adulthood Project: A unique profile of school leavers with autism

Curtin University, The University of Queensland, La Trobe University, University of New South Wales

This longitudinal study is one of two comprehensive studies of Australian adults with autism. This study will follow 160 young adults/school leaver with autism over four years. It aims to identify and describe the unique profiles of Australian school leavers with autism. The transition from school to adult life is one of the most difficult to traverse for young people with autism as services are fragmented, poorly coordinated and not well understood by families (IACC, 2011). Unlike autism diagnosis and early intervention, negligible funding is available in Australia or internationally to address adult service provision or research. As a result, the adult years have been ignored, despite the fact that these years represent the greatest proportion of individuals' lives. Hence, limited guidance exists for people with autism and their families about trajectories across the lifespan and individuals experience high levels of unemployment, mental illness, disengagement, and significant dependency on family members (Piven & Rabins, 2011).

Program 3: Adulthood**Project: Studio G multimedia workshops**

The University of Queensland

Studio G aims to pair young adults with autism with skilled mentors who have industry experience in multimedia. In this way, participants can increase their level of social engagement and develop their technical and social skills in a self-directed, team environment. Young people with autism who have recently left school often struggle with social isolation and a lack of meaningful activity in their daily lives. Recent surveys have demonstrated that post-school life for many young people with high functioning autism can be very difficult. Factors that significantly impact on their emotional wellbeing include their level of social support and employment status (Neary, 2012). Ormond and Kuo (2011) also found young people with autism spent large amounts of time in solitary activities, and that the less time they spent in conversation the more their social impairment increased over time. Autism Queensland is developing the Studio G Program to cater for 16 to 24 year-old participants in 2014 with a view to assisting their transition to post-secondary school education and/or vocational opportunities.