Arrowsmith Program Research Summary Document

2015

Arrowsmith PROGRAM®

Strengthening Learning Capacities®

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This Research Summary Document provides an overview of both completed and ongoing research conducted on the Arrowsmith Program. The studies have been divided into categories:

1) Independent Research In Progress
2) Completed Peer-Reviewed Research
3) Completed Peer-Reviewed and Independent Research
4) Completed Independent Research
5) Other Completed Studies
6) Other Relevant Documents

Links to related documents, websites, and media are also embedded in this document.

Research Study	Year	Study Description	Subjects/ Study Groups	Researcher(s)	University/ Affiliation
Independent Research In Progress					
Arrowsmith Program Brain Imaging Study	2014	The main aim of this study is to gain insight into how the Arrowsmith Program alters the structure and function of the brain of students with learning difficulties. Given that this is the first time that advanced brain imaging has been used to assess the impact of the Arrowsmith Program the data collected will provide preliminary evidence of the impact of training on neuroplastic processes as well as enable power to be determined for a larger, longitudinal study. A longitudinal design will be employed to compare students with a learning difficulty who are enrolled in the Arrowsmith Program with students who have similar learning difficulties but are participating in other educational programs as well as typically developing students with no diagnosed learning difficulties. These comparisons will take place over three time points across the school year.	32 Arrowsmith Program students 14 LD controls 10 typically developing controls 9 to 17 years of age; both genders *Reseachers hope to increase both control groups to 30	Dr. Lara Boyd, PT, PhD Todd C. Handy, PhD Alex MacKay, PhD Vanessa Lapointe, PhD Team Members: Bimal Lakhani PhD Jennifer Foster BS, Nicolas Snow BS, Sue Peters MPT, Katlyn Brown MS, Katie Wadden MS, PhD (cand), Cameron Mang MS, PhD (cand)	Department of Physical Therapy, Brain Behaviour Laboratory, Faculty of Medicine, University of British Columbia Vancouver, BC

Related to this study:

Listen to Dr. Boyd talk about the research

Listen to Howard Eaton, Director of Research, Arrowsmith Program. Director, Eaton Educational Group talk about the research

Research Study	Year	Study Description	Subjects/ Study Groups	Researcher(s)	University/ Affiliation
Independent Research In Progress					
Resting State MRI Measures of Brain Function in Children	2014	The purpose of this study is to determine whether immersion in a specialized learning program will alter fMRI-assessed measures of brain function. Specifically, resting state networks and the strength of white matter pathways, assessed using fMRI and diffusion tensor imaging (DTI), are being examined both within and across subjects who have been assigned to the specialized program or to a standard program.	18 Arrowsmith Program students 13 LD controls All students participating in this study are enrolled at Brehm Preparatory Academy	Gregory M. Rose, PhD, Professor of Anatomy David Gilbert, PhD, Professor of Psychology	University of Southern Illinois Center for Integrated Research in Cognitive & Neural Sciences Carbondale, IL
Study on the Affects of Arrowsmith Program on Individuals with Traumatic Brain Injury	2015	The aim of this study is to gain insight into how the Arrowsmith Program alters the structure and function of the brain of individuals with traumatic brain injury. Advanced brain imaging techniques including fMRI, MRI, myelin water imaging, and EEG are the primary tools in this study to measure structural and functional changes in the brain.	12 adults with various forms of traumatic brain injury	Naznin Virji-Babul, PhD William Panenka, MD, FRCPC Ivan Torres, PhD Alex MacKay, DPhil Faisal Beg, PhD	University of British Columbia Vancouver, BC

Related to these studies:

Resting State MRI Measures of Brain Function in Children

Listen to Dr. Rose talk about the research

Listen to Dr. Collins, Director, Brehm Institute for Cognitive Curricular Research, talk about the research

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Completed Peer-Reviewed Research					
Correlates of a Test of Motor Symbol Sequencing Performance	August 1997	This study investigated the relationship between a test developed to measure the rate of learning a repeated sequence of symbols as an automatic motor pattern and standardized tests of writing and copying. Performance on the motor symbol sequencing test, for a group of 12 individuals with learning difficulties and a control group of 35 adults, correlated significantly with standardized tests of copying and handwriting.	12 individuals with learning difficulties control group of 35 adults Age range 15 to 46	Donald F. Burrill, Ph.D. Barbara A. Young, M.A.	Poster Session - 105th APA Annual Convention Chicago, IL
Treatment Outcome for a Motor Symbol Sequencing Dysfunction	August 2000	This study investigated the relationship between a treatment program designed to train automatic written motor symbol sequences for a group of 12 individuals with learning difficulties having trouble with the writing process and outcome measures on a test developed to measure the rate of learning a repeated sequence of symbols as an automatic motor pattern and standardized tests of writing and copying.	12 right-handed individuals aged 15 to 24 years of average or above-average intelligence identified with specific learning difficulties	Donald F. Burrill, Ph.D. Barbara A. Young, M.A.	Poster Session - 2000 APA Annual Convention Washington D.C

Research Study	Year	Study Description	Subjects/ Study Groups	Researcher(s)	University/ Affiliation
Completed Peer-Reviewed and Independent Research					
A Case Study of The Learning Disabilities Association Of Saskatchewan (LDAS) Arrowsmith Program	November 2013	Case Study research was conducted to investigate how participation in the Learning Disabilities Association of Saskatchewan (LDAS) Arrowsmith Program affected the cognitive, academic, emotional, and interpersonal functioning of five students who attended this program for two to three years.	5 students	Debra Kemp-Koo PhD Candidate	University of Saskatchewan Saskatoon, SK
Effects of the Arrowsmith Program on Academic Performance: A Pilot Study	June 2014	Pre- and post-intervention WJ-III achievement data was collected on 15 students in the Arrowsmith Program. NPStat non-parametric randomization tests were used to determine single-subject improvements across all academic variables, and paired sample t-tests were used to determine differences between pre- and post-testing for several academic domains.	15 students 11 males; 4 females; M age = 9.3 yrs SD = 1.36	James Hale, PhD, Hanna A. Kubas, MSc. Jessica A. Carmichael Kim R. Fitzer	Brain Gain Lab University of Calgary Calgary, AB
A Brain-Based Intervention Program That Changes Cognition: Implications for Academic Achievement	August 2014	Pre- and post-intervention cognitive data was collected on 15 students enrolled in the Arrowsmith Program. NPStat nonparametric randomization tests used to determine single-subject improvements across several cognitive domains. Paired samples t-tests used to determine improvements in short-term memory (Gsm), auditory processing (Ga), fluid reasoning (Gf), and processing speed (Gs).	15 students 11 males; 4 females; M age = 9.3 yrs SD = 1.36	James Hale, PhD, Hanna A. Kubas, MSc. Jessica A. Carmichael Kim R. Fitzer Howard Eaton	Brain Gain Lab University of Calgary Calgary, AB

Research Study	Year	Study Description	Subjects/ Study Groups	Researcher(s)	University/ Affiliation
Completed Independent Research					
Evaluation of the Implementation of the Arrowsmith Program in the TCDSB	July 2000	A three month study comparing 15 students in the Arrowsmith Program within the Toronto Catholic District School Board (TCDSB) to a group of TCDSB students using Autoskill's Academy of Reading Program.	15 Arrowsmith Program students 12 comparison students from Autoskills Academy of Reading program	Data analysis completed by: Dr. Gordon McClure of the Community Health Systems Resource Group (CHSRG) of The Hospital for Sick Children	
Report on the TCDSB Study of the Arrowsmith Program for Learning Disabilities	January 2003	A one-year study comparing outcome measures of 30 grade 2 to grade 7 students enrolled in the Arrowsmith Program from 4 schools in the Toronto Catholic District School Board (TCDSB) to 10 students in a traditional special education classroom for students with learning disabilities.	30 Arrowsmith Program students 10 comparison students from grades 2 to 7	Dr. William Lancee, PhD Head of Research in the Department of Psychiatry at Mount Sinai Hospital and Associate Professor, Department of Psychiatry, University of Toronto	
Report on an Outcome Evaluation of the Arrowsmith Program for Treating Learning Disabled Students	November 2005	A three year outcome study of 79 children with learning difficulties conducted at Arrowsmith School funded by the Canadian Donner Foundation. A number of standardized measures were used such as achievement tests and tests of mental ability as well as measures of learning capacity and changes in rates of learning.	79 students from Arrowsmith School Toronto 53 males 26 females	Dr. William Lancee, PhD Head of Research in the Department of Psychiatry at Mount Sinai Hospital and Associate Professor, Department of Psychiatry, University of Toronto	

Research Study	Year	Study Description	Subjects/ Study Groups	Researcher(s)	University/ Affiliation
Other Completed Studies					
Results from first year of St. Patrick Catholic Secondary School and Arrowsmith Program Pilot Project	June 1998	A pilot project undertaken in co-operation with St. Patrick Catholic Secondary School in the Toronto Catholic District School Board. Report summarizes the averaged quantitative improvements seen in 19 students working on four cognitive areas over a 7 month period.	17 students in grade 9		Toronto Catholic District School Board Toronto, ON
Changes Observed on Cognitive Scores of Arrowsmith Program Students	1999-2007	Changes on Standardized Cognitive Measures of students in the Arrowsmith Program at Eaton Arrowsmith School or by Eaton Learning Centre	7 students	Howard Eaton	Eaton Learning Centre and Eaton Arrowsmith School Vancouver, BC
Report on the Arrowsmith Program in the Toronto Catholic District School Board (TCDSB)	January 2007	A follow-up study tracking progress of students in the Arrowsmith Program in the TCDSB on standardized achievement measures, and the amount of resource support needed pre and post Arrowsmith Program.	120 students with learning difficulties in the Arrowsmith Program in the Toronto Catholic District School Board		

Other Relevant Documents

The following list of documents and media provide further information on both completed and current research initiatives:

Research Section on the Arrowsmith Program website

Academic Skills and Learning Outcomes Brochure

Research Initiatives Report