

MOLLY B. JOHNSON, M.AmSAT, PhD

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POSTDOCTORAL EXPERIENCE

Postdoctoral Research Fellow, Washington University School of Medicine, 2010 – 2011 (Joint Appointment)

Movement Science Program, Program in Physical Therapy (Mentor: Dr. Linda Van Dillen)

Occupational Health & Safety Research Group, Dept. of General Med. Sci. (Mentor: Dr. Bradley Evanoff)

EDUCATION

Ph.D., Neuroscience and Behavior (advisor: Dr. Richard Van Emmerik)

University of Massachusetts, Amherst, MA, 2010

American Society for the Alexander Technique Certified Alexander Instructor (3-year, 1600 hour program)

Dimon Institute, Somerville, MA, 2001

B.A. Biochemistry (Sigma Xi, Cum Laude)

Carleton College, Northfield, MN, 1998

ACADEMIC AND PROFESSIONAL ACTIVITIES AND HONORS

- Founding Member, Austin Area Alexander Technique, since 2014
- American Society for the Alexander Technique Research Grant Review Committee, 2011-2012
- Program Innovation Council Member, Program in Physical Therapy, Washington University, 2010-2011
- St. Louis Movement Science Postdoctoral Group Vice President, 2010-2011
- Supervisor for 10 Undergraduate Research Assistants, University of Massachusetts, 2004-2009
- Neuroscience & Behavior Program Colloquium Series Committee Member, Univ. of Massachusetts, 2008
- Biomechanics and Motor Control Journal Club Student Coordinator, Univ. of Massachusetts, 2005-2006
- Translating Research in Exercise Science Lab Outreach Coordinator, Univ. of Massachusetts, 2004-2005
- American Society for the Alexander Technique Annual General Meeting Policy Committee Co-Chair, 2002
- American Society for the Alexander Technique Annual General Meeting Conference Coordinator, 2001
- Semaphore Dance Company Student Director, Choreographer, and Dancer, Carleton College, 1997-1998
- Dean of Students' Independent Research Fellow, Carleton College, 1997
- Chemistry Department Research Intern, Carleton College, 1996
- Rotary International Exchange Scholar, Thailand, 1993-1994
- Commended National Merit Scholar, 1993
- Performing Musician: Banjo, Guitar, Mandolin, and Voice, since 1990

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

- American Society for the Alexander Technique
- Register of Shaw Method Teachers
- Austin Friends of Traditional Music
- Central Texas Bluegrass Association
- Human Factors and Ergonomics Society
- International Society of Motor Control
- International Society for Posture & Gait Research
- Canadian Society for Psychomotor Learning and Sport Psychology
- Canadian Biomechanics Society
- American Council on Exercise

RESEARCH INTERESTS

The research I was involved in as a graduate student demonstrated that healthy people can voluntarily adopt motor characteristics that interfere with posture, coordination, and respiration. The research I was involved in as a postdoctoral fellow built on these findings by assessing whether healthy people who are predisposed to low back pain development during prolonged standing habitually adopt motor characteristics associated with low back pain and whether their psychosocial characteristics differ from people who are not predisposed to low back pain development. Together, my research aims to demonstrate that psychosocial and motor characteristics have a potential impact on basic motor performance, postural stability, and injury risk. A greater understanding of the connection between psychosocial and motor characteristics, sensory-motor functioning, and musculoskeletal pain could greatly facilitate rehabilitation and preventative interventions. I aim to develop an interdisciplinary research approach that links research on basic motor control and voluntary health behavior to the development of musculoskeletal pain, with implications for furthering alternative approaches to injury prevention and rehabilitation in the fields of performing arts, occupational health, athletics, psychology, and neuroscience.

RESEARCH EXPERIENCE

Research Collaboration, University of Idaho, 2010-present

In collaboration with Rajal Cohen, M.AmSAT, PhD, I collected pilot data on the impact of the Alexander Technique on characteristics of stance, gait, and gait initiation. We are developing methods to assess differences in executive functioning, inhibition, and motor performance between Alexander teachers, healthy controls, and people with neurological disorders. I am also assisting with grant proposals addressing cognitive factors involved in forward head posture in occupational environments.

Postdoctoral Research Fellow, Washington University School of Medicine, St. Louis, MA, 2010-2011

Mentored by Linda Van Dillen, PT, PhD, as part of a clinical trial of classification-specific physical therapy treatment for low back pain, I analyzed data and prepared manuscripts on differences in motor characteristics on clinical tests of trunk and limb movements between subgroups of people with low back pain, genders, and treatment groups. I also developed methods for collecting data on motor characteristics and psychosocial factors in people who do and do not develop low back pain during prolonged standing.

Postdoctoral Research Fellow, Washington University School of Medicine, St. Louis, MA, 2010-2011

Mentored by Bradley Evanoff, MD, MPH, as part of a study on participatory ergonomic interventions for carpenters, I developed methods to assess muscle activity with EMG and joint motion with goniometers at worksites and identify work tasks and body positions that pose the greatest exposure and potential injury risk.

PhD Dissertation, University of Massachusetts, Amherst, MA, 2006-2009

My dissertation research was advised by Richard Van Emmerik, PhD. The goal was to assess how adopting different head orientations would impact postural stability during upright standing and lean and impact postural stability, movement characteristics, and multi-segmental torso coordination during a postural transition task in healthy people. These studies demonstrated that head extension impairs postural stability and leads to sit-to-stand strategy changes that may interfere with coordination. Findings suggest that motor characteristics are related to voluntarily adopted head postures.

Research Collaboration, University of Massachusetts, Amherst, MA, 2008

In collaboration with the Communications Disorders Department, I mentored an Alexander Technique colleague in the collection of pilot data on the impact of Alexander lessons on vocal production in healthy and vocally impaired people. My experience highlighted data analysis methods used for audio signals that could be useful for future research on how vocal and instrumental performance are related to motor characteristics.

Research Assistant, University of Massachusetts, Amherst, MA, 2008

Under the advisement of Joseph Hamill, PhD, I studied lower extremity muscle activation patterns during prolonged standing with different shoe insoles. I collected data and analyzed the spectral density of EMG signals.

Research Assistant, University of Massachusetts, Amherst, MA, 2007-2008

In collaboration with fellow students, under the advisement of Richard Van Emmerik, PhD, I studied respiratory flow, full-body kinematics, and postural sway under conditions that challenged breathing or systematically varied periodic arm motions or rotational motions of the torso. I collected data and developed MATLAB programs to analyze the periodic coherence between breathing flow rate, center of pressure, and body motion.

Major Research Project, University of Massachusetts, Amherst, MA, 2003-2006

My major research project was advised by Richard Van Emmerik, PhD. I studied movement patterns between multiple segments of the trunk during the sit-to-stand task in young, healthy people. I developed a 6-segment 3-D kinematic torso model in Visual 3D to study torso motion. This model was useful for identifying different coordination patterns between regions of the trunk using cross-correlation analyses and showed a high degree of variability common in movement patterns.

Research Assistant, University of Massachusetts, Amherst, MA, 2005

In collaboration with fellow students, under the advisement of Richard Van Emmerik, PhD, I studied postural stability in women with Multiple Sclerosis. I collected kinematic and ground reaction force data and assisted with data analysis and manuscript writing. Results suggest that women with Multiple Sclerosis adopt motor strategies that limit instability.

TEACHING INTERESTS

- Motor Control, Neuroscience, Movement Coordination and Perception, Motor Learning, Kinesiology, Movement Disorders, Movement Therapies, Nikolai Bernstein, Research Methods, Scientific Writing, General Writing, Program Evaluation, Introduction to Psychology

CLASSROOM TEACHING EXPERIENCE

2013-present *Instructor*, Informal Classes, University of Texas, Austin, TX

- Alexander Technique Class – Sole or joint responsibility for lectures and course development
- Shaw Method Swimming Courses - Sole responsibility for instruction and course development

2006-2009 *Instructor / Teaching Associate*, Psychology Department, University of Massachusetts, Amherst, MA

- Junior Writing Seminar - Sole responsibility for lectures, grading, and development of course materials

2003-2006 *Instructor / Teaching Assistant*, Psychology Department, University of Massachusetts, Amherst, MA

- Methods of Psychology Seminar - Sole responsibility for lectures and grading

2001-2009 *Instructor/ Course Master*, Alexander Technique Training Center, Newton, MA

- Functional Anatomy Course - Sole responsibility for lectures and course material

PEER-REVIEWED MANUSCRIPTS – PUBLISHED

Sorensen, C.J., **Johnson, M.B.**, Callaghan, J.P., George, S.Z., Van Dillen, L.R. 2014. Validity of a paradigm for low back pain symptom development during prolonged standing, *The Clinical Journal of Pain*, [published online ahead of print (Aug 28, 2014)], doi: 10.1097/AJP.0000000000000148.

Hoffman, S.L., **Johnson, M.B.**, Zou, D., Van Dillen, L.R. 2012. Gender differences in modifying lumbopelvic movement patterns during hip medial rotation in people with low back pain, *Rehabilitation Research and Practice*, 2012, p. 1-7, doi:10.1155/2012/635312.

Hoffman, S.L., **Johnson, M.B.**, Zou, D., Van Dillen, L.R. 2012. Differences in end range lumbar flexion during slumped sitting and forward bending between low back pain subgroups and genders, *Manual Therapy*, 17:2, p.157-63. doi: 10.1016/j.math. 2011.12.007.

Johnson, M.B., Hamill, J., Van Emmerik, R.E.A. 2012. Effect of head orientation on postural control during upright stance and forward lean, *Motor Control*, 16:1, p.81-93, PMID:22402222.

Johnson, M.B., Van Emmerik, R.E.A. 2011. Is head-on-trunk extension a proprioceptive mediator of postural control and sit-to-stand movement characteristics?, *Journal of Motor Behavior*, 43:6, p. 491-498, doi:10.1080/00222895.2011.631954.

Hoffman, S.L., **Johnson, M.B.**, Zou, D., Van Dillen, L.R. 2011. Sex differences in lumbopelvic movement patterns during hip medial rotation in people with chronic low back pain, *Archives of Physical Medicine and Rehabilitation*, 92:7, p. 1053-1059, doi:10.1016/j.apmr.2011.02.015.

Hoffman, S.L., **Johnson, M.B.**, Zou, D., Harris-Hayes, M., Van Dillen, L.R. 2011. Effect of classification-specific treatment on lumbopelvic motion during hip rotation in people with low back pain, *Manual Therapy*, 16:4, p. 344-350, doi:10.1016/j.math.2010.12.007.

Van Emmerik, R.E.A., Remelius, J.G., **Johnson, M.B.**, Chung, L.H., Kent-Braun, J.A. 2010. Postural control in women with multiple sclerosis: Effects of task, vision and symptomatic fatigue, *Gait & Posture*, 32, p. 608-614, doi:10.1016/j.gaitpost.2010.09.002.

Johnson, M.B., Van Emmerik, R.E.A. 2010. The impact of head orientation on multi-segmental torso coordination during the transition from sitting to standing. Proceedings of the *Human Factors and Ergonomics Society Meeting*, 54:19, p. 1373-1377, doi: 10.1177/154193121005401904.

Johnson, M.B., Cacciatore, T.W., Hamill, J., Van Emmerik, R.E.A. 2010. Multi-segmental torso coordination during the transition from sitting to standing. *Clinical Biomechanics*, 25, p. 199-205, doi:10.1016/j.clinbiomech.2009.11.009.

ABSTRACTS - PUBLISHED

Cohen, R.G., **Johnson, M.B.**, Mancini, M., Horak, F.B. 2012. Differences in postural sway and gait initiation associated with long-term practice of the alexander technique in healthy older adults and with brief instruction in the Alexander Technique in subjects with Parkinson's disease. *International Society for Posture & Gait Research Proceedings*, p. 353, Trondheim, Norway.

ABSTRACTS – PUBLISHED, continued

Sorensen CJ, **Johnson MB**, George SZ, Callaghan JP, Van Dillen LR. 2012. The relationship between psychological factors and low back pain symptom intensity during prolonged standing in back-healthy people: A preliminary study. *The Spine Journal*, 12, p.315.

Johnson, M.B., Hoffman, S.L., Sorensen, C.J., Zou, D., Van Dillen, L.R. 2011. Does classification-specific treatment for low back pain improve lumbopelvic motion during untrained movement? *Medicine and Science in Sports and Exercise, Volume 43:5 Supplement*, Denver, CO.

Johnson, M.B., Van Emmerik, R.E.A., Cacciatore, T.W. 2007. Inter-segmental torso motion during the sit-to-stand task. *International Society for Posture & Gait Research Proceedings*. p. 167, Burlington, VT.

Remelius, J.G., Chung, L.H., **Johnson, M.B.**, Smith, B., Baquis, G., Kent-Braun, J.A., Van Emmerik, R.E.A. 2007. Postural control in multiple sclerosis during reach and lean perturbations, *International Society for Posture & Gait Research Proceedings*, p. 144, Burlington, VT.

Johnson, M.B., Mohrig, J. 1997. The effect of pH on the stereoselectivity of H-D exchange on malic acid and addition of D₂O to fumaric acid. *National Meeting and Exposition of the American Chemical Society Proceedings*, San Francisco, CA.

CONFERENCE PRESENTATIONS

Sorensen, C.J., **Johnson, M.B.**, George, S., Van Dillen, L.R. 2012. Validity of a model for low back pain symptom development during prolonged standing, *American Physical Therapy Association Combined Sections Meeting*, Chicago, IL.

Dale, A.D., Jaegers, L., **Johnson, M.B.**, Evanoff, B. 2011. Task-based measurements to evaluate effectiveness of interventions in participatory ergonomic programs. *National Occupational Injury Research Symposium*, Morgantown, WV.

Cohen, R.G., **Johnson, M.B.**, Mancini, M., Priest, K.C., Horak, F.B. 2011. Differences in Postural Control and Gait Coordination Associated With Long-term Practice Of The Alexander Technique and Parkinson's Disease. *American Society for the Alexander Technique Annual General Meeting*, Las Vegas, NV.

Cohen, R.G., **Johnson, M.B.**, Mancini, M., Horak, F.B. 2011. Changes in coordination associated with long-term practice of the Alexander Technique are opposite those associated with Parkinson's disease. *Symposium for Portland Area Research on Complementary and Alternative Medicine*, Portland, OR.

Johnson, M.B., Van Emmerik, R.E.A. 2011. Impact of head orientation on postural control during stance. *Translational Neuroscience Symposium*, University of Missouri, Columbia.

Rootberg, R, **Johnson, M.B.**, Andrianopoulos, M. 2009. The Alexander Technique as an asset to vocal therapy as measured through standard voice science methods: a pilot study. *Annual Voice Foundation Conference*. Philadelphia, PA.

Johnson, M.B., Remelius, J.G., Van Emmerik, R.E.A., Hamill, J. 2005. Limb loading asymmetries and center of pressure variability during standing. *International Conference on Progress in Motor Control*, State College, PA.

CONFERENCE PRESENTATIONS, continued

Remelius, J.G., Chung, L.H., **Johnson, M.B.**, Smith, B., Baquis, G., Kent-Braun, J.A., Van Emmerik, R.E.A. 2005. Postural control in women with Multiple Sclerosis. *American College of Sports Medicine*, Nashville, TN.

Johnson, M.B., Remelius, J.G., Van Emmerik, R.E.A., Hamill, J. 2004. Postural asymmetries during quiet and unconstrained standing. *Conference for the Canadian Society for Biomechanics*, Halifax, Nova Scotia, Canada.

DISSERTATION AND NON-PEER REVIEWED PUBLICATIONS

Johnson, M.B. 2010. Effect of head orientation on dynamic postural stability and torso coordination. *Electronic Doctoral Dissertations for UMass Amherst*. Paper AAI3397711.

Fader, S.L., **Johnson, M.B.** Winter 2006. Alexander Technique and Parkinson's. *Parkinson's Report*, Vol. XII, issue 1 p. 18.

RELEVANT PROFESSIONAL EXPERIENCE

- 2001-present *Alexander Technique Instructor / Owner*, Integrated Motion Studio, Massachusetts & Austin, TX
- Provide private and group lessons in cognitive-motor re-education for music, dance, and athletic performance; posture; pain management; and injury prevention
- 2011-present *Research Consultant*, Assessment Resources Center, University of Missouri - Columbia
- Perform program evaluations, which involve analyzing data and writing final evaluation reports used to set future program and funding goals
- 2013-present *Shaw Method Swimming Instructor*, Integrated Motion Studio, Austin, TX
- Provide private and group lessons in therapeutic aquatics and Alexander-based swimming to adults & elderly
- 2001-2009 *Training Course Assistant Faculty*, Alexander Technique Training Center, Newton, MA
- Alexander Technique Instruction – Assisted teaching movement re-education and teaching procedures for instructors in training on a small, apprenticeship-like, 3-year Alexander Technique certification program
- 1999-2003 *Personal Trainer*, Healthworks, Boston, MA
- Developed programming and provided exercise training for health management and injury prevention
- 1998 – 1999 *Lifeguard & Swimming Instructor*, Red Cross, Charlottesville, VA
- Monitored pool for risky swimming behavior and emergencies and taught swimming lessons
- 1996-1998 *Student Athletic Trainer*, Carleton College, Northfield, MA
- Provided first aid and injury management for college football and wrestling teams
- 1994-1995 *Job Coach*, Career Awareness Related Experience, Columbia, MO
- Provided job training to at-risk youth; offered mentoring and mediation to caseload of youth to facilitate success of job placements; taught life skills classes

REFERENCES

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Psychology & Communication Studies
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