

Curriculum Vitae
Susan Michelle Rivera

Professional Address:

University of California, Davis
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Education

Ph.D., Developmental Psychology, University of California, Berkeley, CA, December, 1998.
Indiana University, Bloomington, IN, graduate work, 1991-1992.
BA, Psychology, Indiana University, Bloomington, IN, 1991.

Positions Held

2008-present Associate Professor, Department of Psychology, University of California at Davis
2001-2008 Assistant Professor, Department of Psychology, University of California at Davis
1999-2001 Postdoctoral Research Fellow, Stanford Psychiatry Neuroimaging Lab, working with Professor Allan Reiss
1998-1999 Postdoctoral Research Fellow, Center for Developmental Cognitive Neuroscience, working with Dr. Adele Diamond

Honors, Fellowships and Awards

2005-2006 M.I.N.D. Institute Pilot Research Grant Award Recipient
2005-2006 Grant to Promote Extra-Mural Funding, U.C. Davis
2003-2004 Faculty Research Grant Recipient, U.C. Davis
2003-2004 M.I.N.D. Institute Faculty Pilot Grant Award Recipient
2001-2002 IGA Junior Faculty Research Award
2000-2001 National Institute of Health Postdoctoral Training Fellowship
1998-1999 National Institute of Health Postdoctoral Research Fellowship
1998 Outstanding Graduate Student Instructor Award, U.C. Berkeley
1997-1998 American Psychological Association Dissertation Research Award
1996-1997 Graduate Division Dissertation Award Fellowship, U.C., Berkeley
1995-1996 National Research Service Award, National Institute of Mental Health
1992-1995 National Science Foundation Graduate Research Fellowship

Professional Memberships

Cognitive Neuroscience Society
Society for Research in Child Development
Society for Neuroscience

Panels and Advisory Positions

Ad-hoc journal reviewer for:

Archives of General Psychiatry	Developmental Psychology
Biological Psychiatry	Developmental & Behavioral Pediatrics
Brain Research	Development and Psychopathology
Child Development	Journal of Neuroscience
Child Psychology and Psychiatry	Neuroimage
Cognitive Development	

Panel Reviewer:

National Science Foundation, Cognitive Neuroscience program, Spring 2003
Ongoing Ad-hoc grant reviewer for National Science Foundation
Ongoing Ad-hoc grant reviewer for Autism Speaks
Ongoing Ad-hoc grant reviewer for National Institutes of Health

Invited Guest Speaker:

8th International Fragile X Conference, July 17-21, 2002
9th International Fragile X Conference, June 23-27, 2004
Summer Institute on Neurodevelopmental Disorders, August 4-5, 2005
American Educational Research Association Meeting, April 7-11, 2006.
International Society for the Study of Behavioural Phenotypes Meeting, October, 2007.
Learning and the Brain Conference, San Francisco, CA, February 6-9, 2008

Publications

Farzin, F., Charles, E.C., and **Rivera, S.M.** (in press). Development of multimodal numerical processing in infancy. *Infancy*.

Corbett, B.A., Carmean, V., Ravizza, S., Wendelken, C., Henry, M.L., Carter, C. and **Rivera, S.M.** (in press). A functional and structural study of emotion and face processing in children with autism. *Psychiatry Research: Neuroimaging*.

Charles, E. and **Rivera, S.M.** (in press). Object permanence and method of disappearance: Looking measures further contradict reaching measures. *Developmental Science*.

Koldewyn, K., Hessel, D., Adams, J., Tassone, F., Hagerman, R.J., Hagerman, P.J., and **Rivera, S.M.** (2008). Reduced hippocampal activation during recall is associated with elevated FMR1 mRNA and psychiatric symptoms in men with the fragile X premutation. *Brain Imaging and Behavior*, 2(2): 105-116.

Farzin, F., Whitney, D. and **Rivera, S.M.** (2008). Contrast Detection in Infants with Fragile X Syndrome. *Vision Research*, 48(13), 1471-1478.

Rivera, S.M. & Reiss, A.L. (2008). From genes to brain to behavior: The case of fragile X Syndrome. In J. Rumsey & M. Ernst (Eds.), *Neuroimaging in Developmental Clinical Neuroscience*. Cambridge University Press.

Hagerman, R.J., **Rivera, S.M.**, and Hagerman, P.J. (2008). The fragile X family of disorders: A model for autism and targeted treatments. *Current Pediatric Reviews*, 4(1): 40-52.

Nordahl, C.W., Dierker, D., Mostafavi, I., Schumann, C.M., **Rivera, S.M.**, Amaral, D.G., and Van Essen, D.C. (2007). Cortical folding abnormalities in children with autism revealed by surface-based morphometry. *Journal of Neuroscience*, 27(43):11725-11735.

Adams, J.S., Adams, P.E., Nguyen, D., Brunberg, J.A., Tassone, F., Zhang, W., **Rivera, S.M.**, Koldewyn, K., Grigsby, J., DeCarlie, C., Hagerman, P. and Hagerman, R.J. (2007). Volumetric brain changes in females with fragile X associated tremor/ataxia syndrome (FXTAS). *Neurology*, 69(9):851-859.

Simon, T.J., **Rivera, S.M.** (2007). Neuroanatomical Approaches to the Study of Mathematical Ability and Disability. In D. B. Berch & M. M. M. Mazzocco (Eds.), *Why is Math So Hard for Some Children? The Nature and Origins of Mathematical Learning Difficulties and Disabilities*. Baltimore, MD: Paul H. Brookes Publishing Co.

Hessel, D.H., **Rivera, S.M.**, Koldewyn, K., Cordeiro, L., Adams, J., Tassone, F., Hagerman, P.J. and Hagerman, R.J. (2007). Amygdala dysfunction in men with the fragile X premutation. *Brain*, 130 (2):404-16.

Rivera, S.M. & Zawaydeh, A.N. (2006). Word Comprehension Facilitates Object Individuation in 10- and 11-month-old Infants. *Brain Research*, doi:10.1016/j.brainres.2006.08.112.

Cohen S., Masyn, K., Adams J., Hessl D., **Rivera, S.M.**, Cogswell J., Tassone F., Grigsby J., Brunberg J., Leehey, M., Loesch, D., DeCarli, C., Hagerman P., Hagerman R. (2006). Molecular and Imaging Correlates of the Fragile X-Associated tremor Ataxia Syndrome (FXTAS). *Neurology*, 67 (8), 1426-1431.

Rivera, S.M. and Koldewyn, K. (2005). Unraveling the mystery of motion perception impairments in autism: Some further considerations. *Current Psychology of Cognition* 23(1-2):189-197.

Williams, S.E., **Rivera, S.M.** and Reiss, A.L. (2005). Functional MRI of Working Memory in Pediatric Head Injury: A Longitudinal Case Study. *Brain Injury*, 19(7), 549-53.

Rivera, S.M., Reiss, A.L, Eckert, M.A., and Menon, V. (2005). Developmental changes in mental arithmetic: Evidence for increased functional specialization of the left inferior parietal cortex. *Cerebral Cortex*, 15(5), 1779-1790.

Hessl,D., **Rivera, S.M.**, and Reiss, A.L (2004.) The Neuroanatomy and Neuroendocrinology of Fragile X Syndrome. *Mental Retardation and Developmental Disabilities Research Reviews*, 10: 17-24.

Langer, J., **Rivera, S.M.**, Schlesinger, M., and Wakeley, A. (2002). Early Cognitive Development: Ontogeny and Phylogeny. In: Valsiner, J. & Connolly, K. (Eds.), *Handbook of Developmental Psychology*. London: Sage.

Rivera, S.M., Menon, V., White, C.D., Glaser, B., Glover, G. and Reiss, A.L. (2002). Functional brain activation during arithmetic processing in females with fragile X Syndrome is related to FMR-1 protein expression. *Human Brain Mapping*.16(4),206-218.

Menon, V., Mackenzie, K., **Rivera, S.M.**, & Reiss, A.L. (2002). Prefrontal Cortex Involvement in Processing Incorrect Arithmetic Equations: Evidence From Event-Related fMRI. *Human Brain Mapping*, 16(3), 119-130.

Menon V., **Rivera S.M.**, White C.D., Eliez S., Glover G.H., Reiss A.L. (2000). Functional Optimization of Arithmetic Processing in Perfect Performers. *Cognitive Brain Research*, 9 (3) 343-345.

Menon V., **Rivera S.M.**, White C.D., Glover G.H., Reiss A.L. (2000). Dissociating Prefrontal and Parietal Activation During Arithmetic Processing. *Neuroimage*, 12, (4), 357-365.

Wakeley, A., **Rivera, S.M.** & Langer, J. (2000). Can young infants add and subtract? *Child Development*, 71(6), 1525-1534.

Wakeley, A., **Rivera, S.M.**, and Langer, J. (2000). Not proved: Reply to Wynn. *Child Development*, 71(6),1537-1539.

Rivera, S.M., Wakeley, A. & Langer, J. (1999). The drawbridge phenomenon: representational reasoning or perceptual preference? *Developmental Psychology*, v35(2), 427-435.

Papers under review

Farzin, F., **Rivera, S.M.**, and Hessl, D.L.(submitted). Face processing in individuals with fragile X syndrome: An eye tracking study.

Rivera, S.M., David, N., Henry, M.L., Adams, J., Barcellos, T., Brunberg, J.A. and Hagerman, R.J. (submitted). Cerebellar dysfunction in older males with the fragile X premutation: An fMRI investigation.

Losin, E.A.R., **Rivera, S.M.**, O'Hare, E.D., Sowell, E.R., and Pinter, J.D. (submitted). Abnormal activation pattern during a 3 Tesla fMRI auditory language task in individuals with Down syndrome.

Recent Conference Presentations

Farzin F., **Rivera SM.**, Whitney D. Holistic face processing in infants using Mooney faces. Poster presented at the Annual Vision Sciences Society Meeting, Naples, FL, May 2008.

Koldewyn, K., Whitney, D.W., and **Rivera, S.M.** Neural bases of visual motion perception deficits in autism. Paper presented at the Annual Vision Sciences Society meeting, Naples FL, May 2008.

Koldewyn, K., Whitney, D.W., and **Rivera, S.M.** Neural correlates of coherent and biological motion perception deficits in autism. Poster presented at the International Meeting for Autism Research, London, England, May 2008.

Koldewyn, K., Whitney, D.W., and **Rivera, S.M.** Visual Motion Processing in Autism: A psychophysical and fMRI study. Poster presented at annual Society for Neuroscience meeting, San Diego CA, November 2007.

Reynolds Losin, E.A., **Rivera, S.M.**, O'Hare, E.D., Sowell, E.R. and Pinter, J.D. fMRI findings of abnormal activation patterns during an auditory story listening task in individuals with Downs syndrome. Poster presented at annual Society for Neuroscience meeting, San Diego CA, November 2007.

Rivera, S.M. Eye tracking and baby studies: Investigations in fragile X syndrome. Invited symposium lecture at the 10th International Society for the Study of Behavioural Phenotypes Meeting, Sacramento, CA, October, 2007.

Rivera, S.M., Hessler, D.L., Koldewyn, K., Tassone, F. and Hagerman, R.J. Brain-based evidence of limbic system dysfunction in fragile X premutation carriers. Paper presented at the 13th International Workshop on Fragile X and X-Linked Mental Retardation, Venice, Italy, October, 2007.

Farzin, F. and **Rivera, S.M.** Object Representation and Tracking in Infants with Fragile X Syndrome. Paper presented at the 10th International Society for the Study of Behavioural Phenotypes Meeting, Lake Tahoe, CA, October, 2007. *Journal of Intellectual Disability Research*, 51(9).

Koldewyn, K., Henry, M. Le, L. and **Rivera, S.M.** Children with autism show differences in brain activation, despite similar behavioral performance, on a mental arithmetic task. Poster presented at the Cognitive Neuroscience Society Meeting, New York, NY, May 5-8, 2007.

Reynolds, E.A., Pinter, J., Koldewyn, K., Le, L., Backer, K., Tang, M., and **Rivera, S.M.** Deficient intraparietal sulcus activity during number comparison in individuals with Down syndrome. Poster presented at the Cognitive Neuroscience Society Meeting, New York, NY, May 5-8, 2007.

Saron, C.D., Horton, D.M., DeBoer, T., Beransky, M., Colombi, C. and **Rivera, S.M.** Attenuated primary auditory cortex activation in toddlers with autism spectrum disorders: Evidence from high-density middle latency AEPs. Poster presented at the International Meeting for Autism Research, Seattle, WA, May 3-5, 2007.

Farzin, F., Whitney, D., Hagerman, R.J., and **Rivera, S.M.** Visual processing in infants with fragile X syndrome. *Journal of Vision*, Annual Vision Sciences Society Meeting, Sarasota, FL, May 2007.7(9):529.

Farzin, F., Whitney, D., Hagerman R.J., and **Rivera S.M.** Visual development in infants with fragile X Syndrome. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Boston, MA, March 2007.

Zawaydeh, A.N., Farzin F., and **Rivera, S.M.** (2007) The effect of language on infants' object representation system: An investigation using eye-tracking methodology. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Boston, MA, March 2007.

Horton, D.M., Saron, C.D., DeBoer, T. and **Rivera, S.M.** Loudness dependency of the auditory evoked potential in toddlers with autistic spectrum disorders. Poster presented at the annual Society for Neuroscience meeting, Atlanta GA, October 2006.

Corbett, B.A., Ravizza, S., Carmean, V., **Rivera, S.M.**, Henry, M., Ozonoff, S., Koldewyn, K., Carter, C. Differential amygdala activation to affective facial stimuli in children with autism: and fMRI study. Poster presented at the annual Society for Neuroscience meeting, Atlanta GA, October 2006.

Rivera, S.M., Koldewyn, K., Tassone, F., Hagerman, R., Hessler, D. FMRI evidence of amygdala dysfunction in men with the fragile X premutation. Paper presented at the 10th International Fragile X Conference, Atlanta, GA, July, 2006.

Koldewyn, K., **Rivera, S.M.**, Hessler, D., Tassone, F., Hagerman, R.H. Evidence of hippocampal dysfunction in males with the fragile X premutation. Paper presented at the 10th International Fragile X

Conference, Atlanta, GA, July, 2006.

Farzin, F., Mastergeorge, A., Kirkham, N., Hagerman, R.H., **Rivera, S.M.** Information Processing in Infants with Fragile X Syndrome. Paper presented at the 10th International Fragile X Conference, Atlanta, GA, July, 2006.

Mastergeorge, A.M., **Rivera S.M.**, Farzin F., and Hagerman R.J. (2006) Developmental Trajectories of Social Communication Patterns in Infants with Fragile X Syndrome. Paper presented at the 10th International Fragile X Conference, Atlanta, GA, July, 2006.

Saron, C.D., Horton, D.M., Coffey-Corina, S., **Rivera, S.M.** Sensorimotor and multisensory deficits of integration: a behavioral and ERP investigation of children with autism spectrum disorders. Paper presented at the International Meeting for Autism Research, Montreal, Canada, June, 2006.

Koldewyn, K., Hessel, D.H., Tassone, F., Cordeiro, L., Hagerman, R.H., **Rivera, S.M.** Psychophysical and fMRI evidence of amygdala dysfunction in men with the fragile X premutation. Poster presented at the Annual Cognitive Neuroscience Society Meeting, San Francisco, CA, April, 2006.

Saron, C.D., Horton, D.M., Coffey-Corina, S., **Rivera, S.M.** Sight, sound, and touch unbound: an ERP investigation of multisensory integration deficits in children with autism spectrum disorders. Poster presented at the Annual Cognitive Neuroscience Society Meeting, San Francisco, CA, April, 2006.

Rivera, S.M., Henry, M.H., Crone, E., Reynolds, E., Herrera, A., Herrera, A., Chen, I., van der Maas, H., Langer, J. Neural basis of protracted developmental changes in proportional reasoning. Poster presented at the Annual Cognitive Neuroscience Society Meeting, San Francisco, CA, April, 2006.

Rivera, S.M. The neural bases of quantitative reasoning, insights from typical and atypical development. Invited talk at the Annual American Educational Research Association Meeting, San Francisco, CA, April, 2006.

Rivera, S.M., Koldewyn, K., Henry, M.L., and Solomon, M. Performance disparity cannot explain differences in brain activation in children with autism. Paper presented at the Annual Society for Neuroscience Meeting, Washington, D.C., November, 2005.

Koldewyn, K., **Rivera, S.M.**, Hessel, D., Tassone, F. and Hagerman, R. Evidence of hippocampal dysfunction in males with the fragile X permutation. Paper presented at the annual Society for Neuroscience Meeting, Washington, D.C., November, 2005.

Saron, C.D., Horton, D.M. and **Rivera, S.M.** Visual, auditory, and somatosensory stimuli in the same perceptual binding domain: A trisensory stimulator for investigating multisensory integration deficits in autism using reaction time and high-density event-related potentials. Paper presented at the annual Society for Neuroscience Meeting, Washington, D.C., November, 2005.

Henry, M.L., Crone, E., Langer, J., van der Maas, H., and **Rivera, S.M.** Investigating the Neural Organization of Reasoning Skills in Children and Adults Using the Balance Scale Task. Paper presented at the Biennial Meeting of the Society for Research in Child Development, Atlanta, GA, April, 2005.

Koldewyn, K., Henry, M.L., Solomon, M. and **Rivera, S.M.** Children with autism show functional activation differences on a response inhibition task. Paper presented at the Annual Cognitive Neuroscience Society Meeting, New York, NY, April, 2005.

Rivera, S.M., Koldewyn, K. and Henry, M. Children with autism show a different functional neuroarchitecture regardless of differences in behavioral performance. Paper presented at the Society for Neuroscience Meeting, San Diego, CA, October, 2004.

Rivera, S.M., David, N., Barcellos, T., Henry, M.L. and Hagerman, R.J. *Effects of the fragile X-associated Tremor Ataxia Syndrome on cerebellar functioning: An fMRI study.* Invited Symposium talk: 9th International Fragile X Conference, Washington, DC, June, 2004.

Rivera, S.M., Mikaelian, B. and Henry, M.L. *Differences in brain activation in children with autism independent of behavioral performance.* Paper presented at the International Meeting for Autism Research, Sacramento, CA, May, 2004.

David, N., **Rivera, S.M.**, and Hagerman, R.J. An fMRI Study of Cerebellar Dysfunction in Fragile X-associated Tremor/ Ataxia Syndrome. Paper to be presented at the Annual Cognitive

Neuroscience Society Meeting, San Francisco, CA, April, 2004.

Rivera, S.M. *Using fMRI to show the neural substrates of stage-like learning: the case of conservation reasoning.* Symposium talk presented at the Biennial Meeting of the Society for Research in Child Development, Tampa, FL, April, 2003.

Research Support

Active:

Cure Autism Now Pilot Research Study (Saron) 11/01/05-10/31/07

Cure Autism Now \$120,000

Behavioral and Brain Responses to Sensory Processing in Children with Autism Spectrum Disorders

This project examines the behavioral (reaction time), electromyographic (EMG), and brain (EEG) responses to sensory processing in children with Autism Spectrum Disorders (ASD) as compared to typically developing (TD) children. Specifically, it examines the integration of multiple sensory systems through analysis of dense-channel array event related potentials (ERPs) elicited in response to visual, auditory, and somatosensory stimuli delivered alone or in simultaneous combination

Role: Co- PI

Autism Speaks Mentored Research Award (Rivera) 1/1/07-12/31/08

Autism Speaks \$56,000

Biological Motion Perception in Autism: A window into social cognition deficits?

The goal of this project is to gain new knowledge about the social deficits seen in autism by studying biological motion perception. It employs fMRI paradigms probing both biological motion and coherent motion perception, in an effort to determine to what extent these deficits can be explained primarily as a dorsal stream deficit versus deficits in higher-order social cognition areas.

Role: PI

1 R01 MH078041-01 (Hessl) 6/1/07-5/31/12

NIH/NIMH \$1,500,000

Limbic system function in carriers of the fragile X premutation

This project investigates relations between molecular genetic, neuropsychological and physiological systems underlying social-emotional and memory functioning in adult males with the fragile X premutation.

Role: Co-PI

1 R01 HD056031 (Rivera) 8/8/07-5/31/12

NIH/NICHD \$ 1,274,000

Visual Processing and Later Cognitive Effects in Infants with fragile X Syndrome

This project is a prospective, longitudinal study that will elucidate early visual processing differences in infants with fragile X Syndrome and how abnormal visual processing, if present, relates to cognitive deficits known to emerge in early childhood.

Role: PI

1 R21 MH080025-01 (Rivera) 9/1/07-8/31/09

NIH/NIMH \$417,000

Amygdala Function in Children and Adolescents with Fragile X Syndrome

The goal of the project is to investigate molecular, neuroanatomical and functional aspects of amygdala dysfunction in child and adolescent females and high-functioning males with the fragile X full mutation.

Role: PI

1 RL1NS062412 (Simon) 09/30/07-09/29/12

NIH/NINDS \$1,792,000

Fragile X Spectrum as a Model to Explore Mechanisms in Neurogenetic Disorders

Component 5 of 1UL1RR024922-01 Hagerman, PJ (P.I.) NIH/NCRR

NeuroTherapeutics Research Consortium

The principal objective of Component 5 is to understand how variations in the mutation of a single gene

(FMR1) produce a spectrum of cognitive dysfunction in both childhood and adulthood. To this end, we will generate the first detailed neurocognitive profile of an integrated set of cognitive domains that preliminary data suggest are highly vulnerable to changes in the expression of FMRP.

Role: Co-PI on Component 5

Completed:

Pilot Grant Program (Rivera) 7/01/03-7/01/04
U.C. Davis M.I.N.D. Institute \$20,000

Do children with autism show an atypical functional neural architecture or tasks on which their performance is not impaired?

This project investigated the neural pathogenesis of autism by using fMRI with high-functioning children with autism, and evaluating their brain activation patterns (with respect to those of matched controls) on two task domains for which no cognitive deficits exist: arithmetic reasoning, and simple response inhibition.

Role: PI

Investigator Initiated Award (Saron) 07/01/04 – 07/01/06
U.C. Davis M.I.N.D. Institute \$60,000

Brain Dynamics of Simple Multisensory Integration in Autism Spectrum Disorders.

This project investigated the brain regions involved in multisensory integration in typically developing (TD) children and children with autism spectrum disorders (ASD).

Role: Co-PI

Grant to Promote Extramural Funding (Rivera) 07/01/05-9/30/06
U.C. Davis Committee on Research \$46,000

Sensory, social, and emotional processing in infants with fragile X Syndrome

This grant provided support to gather data needed to apply for an NIH R01 award for a prospective, longitudinal study to elucidate early visual processing differences in infants with fragile X Syndrome. The study probed how abnormal visual processing, if present, relates to cognitive deficits known to emerge in early childhood.

Role: PI

Pilot Grant Program (Rivera) 01/01/06-12/31/06
U.C. Davis M.I.N.D. Institute \$25,000

Biological Motion Perception in Autism: A window into social cognition deficits?

The goal of this project is to gain new knowledge about the social deficits seen in autism by studying biological motion perception. It employs fMRI paradigms probing both biological motion and coherent motion perception, in an effort to determine to what extent these deficits can be explained primarily as a dorsal stream deficit and to what extent they may be the result of deficits in higher-order social cognition areas.

Role: PI