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Research Interests

I am interested in the psychological processes of inhibition and attention, as they relate to healthy children and those who show deficits in these areas, such as children with Attention Deficit Hyperactivity Disorder (ADHD). Inhibition can also be thought of in terms of impulse or behavioural control.

Generally, my research involves having children or adults complete tasks requiring these processes, with subsequent consideration of their task performance and concurrent brain electrical activity (e.g. EEG and/or event-related potentials, or ERPs) to understand the behaviour in terms of its neural correlates.

Some key areas of interest include:

1. The development of inhibition and attention through childhood and into adulthood.
2. The role that energetic and other factors play in the effective use of these processes.
3. How these processes are best measured via brain electrical activity.
4. The use of cognitive and neurocognitive training to improve impulse control, memory and attention.

Here are some example publications in these areas of interest:

1. The development of inhibition and attention throughout childhood and into adulthood

Dimoska, A. Johnstone, S. J., Chiswick, D., Barry, R. J. and Clarke, A. R. (2007). A developmental investigation of stop-signal inhibition: Dissociating low- and higher-frequency activity in the event-related potential. *Journal of Psychophysiology*, 21, 109-126.

Johnstone, S.J., Dimoska, A., Smith, J. L., Barry, R. J., Pleffer, C.B., Chiswick, D., Clarke, A. R. (2007). The development of stop-signal and go/nogo response inhibition in children aged 7-12 years: Performance and event-related potential indices. *International Journal of Psychophysiology*, 63, 25-38.

Johnstone, S. J., Pleffer, C. B., Barry, R. J. Clarke, A. R. & Smith, J. (2005). Development of inhibitory processing during the Go/Nogo task: A behavioural and event-related potential study of children and adults. *Journal of Psychophysiology*, 19, 11-23.

Johnstone, S. J., Barry, R. J., Anderson, J. W. and Coyle, S. F. (1996). Age-related changes in child and adolescent event-related potential component morphology, amplitude and latency to standard and target stimuli in an auditory oddball task. *International Journal of Psychophysiology*, 24, 223-238.

2. The role that energetic and other factors play in the effective use of these processes

- Johnstone, S. J., Watt, A. J., Dimoska, A. (2010). Varying required effort during interference control in children with AD/HD: Task performance and ERPs. *International Journal of Psychophysiology*, 76, 174-185.
- Benikos, N. and Johnstone, S. J. (2009). Arousal-state modulation in AD/HD: A topographic and preparation potential analysis of response inhibition. *Clinical Neurophysiology*, 120, 30-40
- Johnstone, S. J. & Clarke, A. R. (2009). Dysfunctional response preparation and inhibition during a visual go/nogo task in children with two subtypes of Attention-Deficit Hyperactivity Disorder. *Psychiatry Research*, 166, 223-237.
- Johnstone, S. J., Barry, R. J., Markovska, V., Dimoska, A. & Clarke, A. R. (2009). Response inhibition and interference control in children with AD/HD: A visual ERP investigation. *International Journal of Psychophysiology*, 72, 145-153.
- Johnstone, S. J., Barry, R. J. and Clarke, A. R. (2007). Behavioural and ERP indices of response inhibition during a stop-signal task in children with two subtypes of Attention-Deficit Hyperactivity Disorder. *International Journal of Psychophysiology*, 66, 37-47.
- Broyd, S. J., Johnstone, S. J., Barry, R. J., Clarke, A. R., McCarthy, R., Selikowitz, M. & Lawrence, C. A. (2005). The effect of methylphenidate on response inhibition and the event-related potentials of children with Attention-Deficit/Hyperactivity Disorder. *International Journal of Psychophysiology*. 58, 47-58.
- Smith J. L., Johnstone, S. J., Barry, R. J. (2004). Inhibitory processing during the Go/NoGo task: An ERP analysis of children with Attention-Deficit/Hyperactivity Disorder. *Clinical Neurophysiology*, 115, 1320-1331.
- Dimoska, A., Johnstone, S. J., Barry, R. J. and Clarke, A. R. (2003). Inhibitory motor control in children with attention-deficit/hyperactivity disorder: Event-related potential in the stop-signal paradigm. *Biological Psychiatry*, 54, 1340-1349.
- Smith, J. L., Johnstone, S. J. and Barry, R. J. (2003). Aiding diagnosis of attention deficit hyperactivity disorder and its subtypes: discriminant function analysis of event-related potential data. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, 44, 1067-1065.
- Johnstone, S. J., Barry, R. J., Dimoska, A. (2003). Event-related slow-wave activity in two subtypes of attention-deficit hyperactivity disorder. *Clinical Neurophysiology*, 114, 504-514.
- Barry, R.J., Clarke, A.R. and Johnstone, S.J. (2003). A review of electrophysiology in Attention-deficit/Hyperactivity Disorder: I. Qualitative and quantitative electroencephalography. *Clinical Neurophysiology*, 114, 171-183.
- Barry, R.J., Johnstone, S.J. and Clarke, A.R. (2003). A review of electrophysiology in Attention-deficit/Hyperactivity Disorder: II. Event-related potentials. *Clinical Neurophysiology*, 114, 184-198.
- Johnstone, S. J., Barry, R. J., Anderson, J. W. (2001). Topographic distribution and developmental timecourse of auditory event-related potentials in two subtypes of attention-deficit hyperactivity disorder. *International Journal of Psychophysiology*, 42, 73-94.
- Johnstone, S. J., Tardif, H. P., Barry, R. J. & Sands, T. (2001). Nasal bilevel positive airway pressure therapy in children with a sleep-related breathing disorder and attention-deficit hyperactivity disorder: Effects on electrophysiological measures of brain function. *Sleep Medicine*, 2, 407-416.
- Johnstone, S. J., & Barry, R. J. (1996). Auditory event-related potentials to a two-tone discrimination paradigm in Attention-deficit Hyperactivity Disorder. *Psychiatry Research*, 64, 179-192.

3. How inhibition and attention are best measured via brain electrical activity

Benikos, N., Johnstone, S. J., Roodenrys, S. (under review). Electrophysiological and behavioural indices of varying task difficulty in the Go/Nogo task. *IJOP special issue*.

Dimoska, A. and Johnstone, S. J. (2008). Effects of varying stop-signal probability on ERPs in the stop-signal task: Do they reflect variations in inhibitory processing or simply novelty effects? *Biological Psychology*, 77, 324-336.

Smith, J. L., Johnstone, S. J. & Barry, R. J. (2008). Movement-related potentials in the Go/NoGo task: The P3 reflects both cognitive and motor inhibition. *Clinical Neurophysiology*, 119, 704-714.

Dimoska, A. and Johnstone, S.J. (2007). Neural mechanisms underlying trait impulsivity in non-clinical adults: Stop-signal performance and event-related potentials. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 31, 443-454.

Smith, J. L., Johnstone, S. J. & Barry, R. J. (2007). Response priming in the Go/Nogo task: The N2 reflects neither inhibition nor conflict. *Clinical Neurophysiology*, 118, 343-355.

Dimoska, A., Johnstone, S. J., Barry, R. (2006). The auditory-evoked N2 and P3 components in the stop-signal task: Indices of inhibition, response-conflict or error-detection? *Brain and Cognition*, 62, 98-112.

Smith, J. L., Johnstone, S. J. & Barry, R. J. (2006). Effects of pre-stimulus processing on subsequent events in a warned Go/NoGo paradigm: Response preparation, execution and inhibition. *International Journal of Psychophysiology*, 61, 121-133.

Oddy, B. W., Barry, R. J., Johnstone, S. J. & Clarke, A. R. (2005). Removal of CNV Effects from the N2 and P3 ERP Components in a Visual Go/NoGo Task. *Journal of Psychophysiology*, 19, 24-34.

4. The use of cognitive and neurocognitive training to improve impulse control, memory and attention

Johnstone, S. J., Roodenrys, S., Blackman, R., Johnston, E., Loveday, K., Mantz, S., Barratt, M. (under review). Neurocognitive training for children with and without AD/HD. *ADHD Attention Deficit and Hyperactivity Disorders*.

Johnstone, S. J., Blackman, R. J., Bruggemann, J. (in press). EEG from a single channel dry sensor recording device. *Clinical EEG and Neuroscience*. Accepted 20/6/2011.

Johnstone, S. J., Roodenrys, S., Phillips, E., Watt, A. J. & Mantz, S. (2010). Combined working memory and inhibition training for children with AD/HD. *ADHD Attention Deficit and Hyperactivity Disorders*, 2, 31-42.

Loveday, K., Johnstone, S. J. & Roodenrys, S. J. (2010). Computerised inhibition and working memory training for children with and without Attention-Deficit/Hyperactivity Disorder: An active-task EEG analysis. *Clinical EEG and Neuroscience*, 41 (2), 111-111.

Johnstone, S. J., Roodenrys, S. (2010). Australian Provisional Patent (PCT/AU2010/000260). Method and apparatus.

Johnstone, S. J., Roodenrys, S. & Philips, E. R. (2008). Cognitive training for children with AD/HD: A pilot investigation of behaviour, task performance and ERPs. *International Journal of Psychophysiology*, 69, p. 196.

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