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## Striking a chord for science at Boston matinee

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**PEGGY CURRAN, The Gazette**

Published: Tuesday, April 04, 2006

Does Mozart give you goosebumps, make your heart race or throw you into a cold sweat? Inquiring minds want to know.

Scientists at McGill University are teaming up with the Boston Symphony Orchestra this weekend for an experiment which explores when, why and how live music pushes emotional buttons for musicians, listeners and the maestro himself.

For the Saturday matinee at Boston's Symphony Hall, where the program features a Mozart overture and a child-friendly piece by Rob Kapilow called Green Eggs and Ham, BSO conductor Keith Lockhart will be decked out in a specially-made "conductor's jacket" rigged out with electronic sensors that track his heart rate, muscle movements and other physiological responses.

Five musicians and 15 people in the audience will be wearing skin response sensors, the same simple technology used to measure heart rates at the gym or sweaty palms on a polygraph test. Another 35 people will be asked to use a sliding mechanism to gauge their feelings as they listen to the pieces.

For Daniel Levitin, a cognitive neuroscientist at McGill, and Stephen McAdams, a cognitive psychologist, this is the latest stage in their on-going quest to understand age-old musical mysteries - how our brains process and remember music, what strikes an emotional chord and why one person's Shostakovich is the other guy's Jethro Tull.

Levitin said he believes most of us take it for granted that a symphony conductor feels the dips and swings of a musical score and strives to transmit that energy to the orchestra and audience.

By monitoring a sampling of players, researchers hope to follow the trajectory of that emotional wave in the seconds it takes for the music to spring from the maestro's baton to the strings of the cello to the pensioner in row G.

"Can we see this emotional trace?" asks Levitin. "The question is whether we can see a neuro-physiological picture of this happen."

He expects it will take weeks or even months to sort and digest more than one million pieces of scientific data they will collect. The performance will be taped and shown later to Montreal audiences, to determine whether those emotional peaks and valleys lose anything in the transition from live to Memorex.

Teresa Nakra, a music technologist and one of the investigators involved in this week's experiment, was a



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graduate student at the Massachusetts Institute of Technology four years ago when she designed the electronic sensing equipment sewn into Lockhart's jacket.

During a showy performance that married art and science, Lockhart's heart rate and other vital signs were monitored and projected onto a giant screen during a BSO concert.

Several years ago, McAdams, then a researcher at Ircam, a renowned music research facility in Paris, joined forces with Pulitzer Prize-winning composer Roger Reynolds to see whether listeners actually get the message.

During the 2001 premiere of Reynolds's piano concerto The Angel of Death, they used the sliding technique to test whether audience members were able to recognize musical fragments when they heard them later in the same piece of music.

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