Is Music For Thinking?

We wanted to learn does music help the brain study or does it distract us? It seemed there were people that wanted to be quiet and study without music for thinking and others who thought using music for thinking was the only way to go? Who was right or were both points valid?

In 2007 colleagues and I conducted a 42 participant study as part of a research school experiment on working memory and cognitive loading. We explored using music as a strategic intervention to alter working memory loads. The premise was music could aid in more effectual encoding to increase learning potential. As we learn extraneous or intrinsic cognitive load is invoked. Extraneous working memory loading is experienced by learners as they interact with instructional materials. Intrinsic cognitive load is the inherent level of difficulty associated with instructional materials (Chandler and Sweller 1991). More learning cues such as using pictures as well as words, learning with a song or even allowing student’s hands on instruction helps decrease this load. The more unnecessary information it takes to deliver your point the more extraneous cognitive load is produced. What we wanted to know was using music to help thinking a good strategy? (Ayres 2006) states that when intrinsic or extraneous cognitive load is high, working memory is overloaded and learning is adversely affected. That seemed to say that music for thinking was really just a distraction.
This process happens as we learn new skills that we later do with some automaticity such as driving, riding a bike, learning a musical instrument or even doing algebra. The forming of efficient categorization and schemas is called germane load (Paas et al 2003, Sweller et al 1998).

So why would we think music could help the brain with study?

Music, The Brain and How it Looks From the Inside

We considered that since music aids in efficient categorization perhaps learning and music together could decrease cognitive loading and increase germane ability by lightening the load. **We tested this by having participants first listen to music designed to entrain concentration.** According to (Doman 2007) entrainment can occur in as little as one minute. Music with specific timbres and rhythmic structure has demonstrated an increase in effectual category formation, (Ostrander1994, Rose1997) and can aid visual spatial perception, (Ruvenshteyn and Parrino, 2005) (Orel, 2006) **Music is shown to aid in hemispheric transfer or communication between both halves of the brain** (Taut et al 2005). We felt participants in the auditory condition would increase germane load and decrease extraneous load. The decrease in extraneous load is expected because of the neuronal changes evoked by entrainment (Pouliot 1998) (Carter and Russel 1992)

What were our findings? Approximately 50% of our participants immediately increased their ability to sustain cognitive load by 150%. The other 50% decreased in this ability however many of these reported greater clarity of thought later in the day and improved their testing scores considerably. The lesson we learned from this is that for music to be effective at least for ½ the population consistency is the key. **Many individuals need a consolidation period where learning is categorized and music is internalized.**
In fact, there are long term benefits of listening to music, notes Dan Levitin in This is Your Brain on Music. Music For Thinking might help you study or it could distract you. Would you want to join an online trial to test this out? For more of the clinical ways people are experimenting with music see Why Does Music Therapy Matter?

“Music listening enhances or changes certain neural circuits, including the density of dendritic connections in the primary auditory cortex...The front portion of the corpus callosum—the mass of fibers connecting the two cerebral hemispheres—is significantly larger in musicians than non-musicians, and particularly for musicians who began their training early...Musicians tend to have larger cerebellums than non-musicians, and an increased concentration of grey matter...responsible for information processing.” In the end music is like exercise, starting later in life is better than not starting at all and may confer neuroprotective benefits...but that is another study. Maybe we should give music for thinking a chance!

This study was flawed without enough participants, statistical expertise or time. It would be great to try this study online with thousands of participants as a part of PLOT (Public Led Online Trials) a division of ThinkWell. Got ideas for research? Let us know by commenting below!

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References


Learning Disabled Boys Stanford University USA


Doman A, (2007) ABT conference Miami Fl. Advanced Brain Technology 5748 South Adams Avenue Parkway Ogden, Utah 84405, USA


Price A, Kessler R, 2006 “Sparks of Genius Recovered?”, Thinking Pays Boca Raton FL USA
Price A, Kirkpatrick M, Groszek M, “2007, Just practise? Or can ergonomic brain instruction or musical entrainment lighten the cognitive load to increase working memory performance and working load stamina?” Open University, Milton Keyne UK


Thaut, M., Peterson D., and McIntosh G. (2005) ‘Temporal Entrainment of Cognitive Functions: Musical Mnemonics Induce Brain Plasticity and Oscillatory Synchrony in Neural Networks Underlying Memory’, The Center for Biomedical Research in Music, Molecular, Cellular, and Integrative Neuroscience Programs, Colorado State University, Fort Collins, Colorado 80523, USA


Price A, Kessler R, 2006 “Sparks of Genius Recovered?”, Thinking Pays Boca Raton FL USA

Price A, Kirkpatrick M, Groszek M, “2007, Just practise? Or can ergonomic brain instruction or musical entrainment lighten the cognitive load to increase working memory performance and working load stamina?” Open University, Milton Keynes UK

