

European College of Neuropsychopharmacology (ECNP) – press release

## ***Is the “Mozart Effect” real? New analysis indicates that music can help epilepsy***

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Type of study: peer-reviewed/meta-analysis/people

A new comprehensive analysis on the effect of Mozart’s music on epilepsy has confirmed that listening to his piano music can reduce the frequency of epilepsy attacks. The results of this comprehensive meta-analysis (a study of studies), which may overturn current scepticism about the effect, are presented at the ECNP congress after recent publication in a peer-reviewed journal\*.

The idea that listening to Mozart may have beneficial effects on mental health arose from early findings in the 1990s. There have been several studies since, but many involved small numbers of people, or have been of variable quality, leading to mixed evidence overall. This has meant that the “Mozart Effect” has been treated with some scepticism by many clinicians. Now two Italian Researchers, Dr Gianluca Sesso and Dr Federico Sicca from the University of Pisa have conducted a systematic review of works related to the effect of Mozart’s music on epilepsy.

Working according to accepted standard methods for analysing clinical treatment, they looked at 147 published research articles, which they then evaluated according to such things as relevance and quality of the research. This allowed them to select 12 pieces of research which they gathered into 9 separate groups, representing the best available science on the effect of Mozart’s music on epilepsy.

They found that listening to Mozart, especially on a daily basis, led to a significant reduction in epileptic seizures, and also to a reduced frequency of abnormal brain activities in epileptic patients (called *interictal epileptiform discharges*, which are commonly seen in epileptic patients). These effects occurred after a single listening session and were maintained after a prolonged period of treatment.

Gianluca Sesso said *“This isn’t the first such review of the effect of Mozart’s music on epilepsy, but there has been a flow of new research in the last few years, so it was time to stand back and look at the overall picture. The design of the studies varies, for example some people look at a single listening session, others at daily listening sessions, so it’s not easy to form a conclusion.*

*Epilepsy is surprisingly common, affecting just under 1 person in a hundred worldwide. This means that it has significant social and personal costs. Mostly it’s treated by drugs, but these drugs don’t work in around 30% of patients, so we need to be open to other therapies: the*

*important thing is that these therapies can be tested and shown to work, and this is what we have shown here”.*

The meta-analysis indicates that a period of listening to Mozart can give an average reduction in epileptic seizures ranging from between 31% to 66%, but this varies from person to person and according to the music stimulus used. The original studies on the Mozart Effect used the sonata for 2 pianos, K448, and this has remained the music most used in studies. The K545 piano sonata has also been shown to have an effect.

*Dr Sesso said “All cultures have music, so it obviously fulfils some psychological need. The mechanisms of the Mozart Effect are poorly understood. Obviously other music may have similar effects, but it may be that Mozart’s sonatas have distinctive rhythmic structures which are particularly suited to working on epilepsy. This may involve several brain systems, but this would need to be proven.*

*This is a review of research, and not original research. One thing it shows is that we need more consistent studies into the effect of music on the mind”*

*Commenting, Dr Vesta Steibliene, Lithuanian University of Health Sciences, and member of the ECNP Abstract and Poster Committee said:*

*“There is growing interest in non-invasive brain stimulation techniques in the treatment of neuropsychiatric disorders. This review revealed that Mozart music could be an effective non-invasive method of neurostimulation, reducing the frequency of epileptic seizures, even in hard to treat patients. However, in order to use this method in clinical settings, the exact mechanism of the Mozart music effect on the brain regions should be better understood”.*

Dr Steibliene was not involved in this work, this is an independent comment.

\*See published paper, Safe and sound: Meta-analyzing the Mozart effect on epilepsy. Gianluca Sesso, Federico Sicca, Clinical Neurophysiology 131 (2020) 1610–1620

## **Music**

Here are links to excerpts from the Mozart piano sonatas mentioned in the press release:

K448 for 2 pianos, (pianists Murray Perahia and Radu Lupu)

<https://open.spotify.com/embed/album/02fMutJIKcohWLEZ3UhAux>

K545 sonata (pianist, Lang Lang)

<https://open.spotify.com/embed/album/2j6Cg49cL6PtyDODubUzGY>

*These links may be included in press reports.*

**ENDS**

## **Notes for Editors**

### **European College of Neuropsychopharmacology (ECNP)**

The ECNP is an independent scientific association dedicated to the science and treatment of disorders of the brain. It is the largest non-institutional supporter of applied and translational neuroscience research and education in Europe. Website: [www.ecnp.eu](http://www.ecnp.eu)

The 33rd annual ECNP Congress takes place from 12th to 15th September. It is Europe's premier scientific meeting for disease-oriented brain research. In 2020 it is a virtual congress. The regular congress annually attracting up to 6,000 neuroscientists, psychiatrists, neurologists and psychologists from around the world. Congress website: <https://www.ecnp.eu/Congress2020> The 2021 congress is scheduled to take place in Lisbon next September.

### **Conference Abstract: Safe and sound: meta-analysing the Mozart effect on epilepsy**

G. Sesso<sup>1</sup>, F. Sicca<sup>2</sup>

<sup>1</sup>University of Pisa, Department of Experimental and Clinical Medicine, Pisa, Italy ; <sup>2</sup>IRCCS Stella Maris Foundation, Department of Developmental Neuroscience, Pisa, Italy

#### **Background**

Among the complementary non-pharmacological approaches for drug-resistant epilepsy, there is a growing interest in non-invasive forms of neurostimulation such as music therapy. Indeed, evidence is still accumulating since therapeutic effects of Mozart's music in epilepsy have been first reported in 1998 [1]. Nonetheless, the use of music-based neurostimulation for treating seizures and interictal epileptiform discharges (IED) (the so-called "Mozart effect") remains a controversial issue [2], [3].

#### **Objective**

We have conducted an updated meta-analysis to systematically review literature evidence and provide further insights about the role of the Mozart effect in epilepsy.

#### **Methods**

Following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [4], we searched three bibliographic databases (PubMed, Scopus and Web of Science) from their date of inception to January 2020. Clinical studies aimed at assessing the effects of music exposure on patients with epilepsy, by means of pre- to peri- or post-treatment comparisons, were included. Nine meta-analyses were performed according to music stimulation protocols and outcome measures. We applied the Cochrane Q test and the I<sup>2</sup> index for heterogeneity evaluation, and either fixed effects or random effects models to compute mean differences and pool data.

#### **Results**

Of 147 abstracts retrieved using our search strategy, 12 studies were included and grouped according to stimulation protocols and outcome measures. The assessment of the effects of three different music stimuli was replicated at least twice among the studies, thus providing sufficient evidence to be included in our meta-analyses: Mozart's Sonata for two pianos in D major K448, Mozart's piano sonata in C major K545 and a set of Mozart's compositions. The nine meta-analyses respectively showed an overall significant reduction, compared to baseline, in: (1) seizures frequency during a treatment period (31.17%, 95% CI: 20.70 – 41.64), and IED frequency (2) during (28.21%, 95% CI: 17.62 – 38.80) and (3) after (20.12%, 95% CI: 7.76 – 32.48) a single stimulation, and (4) after a treatment period (79.29%, 95% CI: 68.35 – 90.23) with K448 sonata; seizures frequency (5) after a treatment period with a set of Mozart's compositions (66.17%, 95% CI: 38.99 – 93.36); IED frequency (6) during (35.51%, 95% CI: 25.36 – 45.67) and (7) after (37.78%, 95% CI: 24.04 – 51.52) a single stimulation with K545 sonata; a slightly non-significantly greater reduction in IED frequency (8) during (1.04%, 95% CI: 11.53 – 13.60) and (9) after (8.88%, 95% CI: 7.11 – 24.87) a single stimulation with K545 compared to K448 sonatas.

#### **Conclusions**

The highly consistent results of our meta-analysis strongly suggest that music-based neurostimulation may improve the clinical outcome in epilepsy, by reducing seizures and IED, and, thus, deserves not to be kept out of the set of non-pharmacological complementary approaches for treating epilepsy. Nonetheless, it also points out that the actual potential of music to treat the different forms of epilepsy and the definition of the most effective protocols need further and stronger evidence, hopefully through multicenter research trials.

## References

[1] Hughes, J.R., Daaboul, Y., Fino, J.J., Shaw, G.L., 1998. The “Mozart Effect” on epileptiform activity. *Clinical Electroencephalography* 29, 109–119. [2] Brackney, D.E., Brooks, J.L., 2017. Complementary and alternative medicine: the Mozart effect on childhood epilepsy – a systematic review. *The Journal of School Nursing* 34, 28–37. [3] Dastgheib, S.S., Layegh, P., Sadeghi, R., Foroughipour, M., Shoeibi, A., Gorji, A., 2013. The Effects of Mozart’s music on interictal activity in epileptic patients: systematic review and meta-analysis of the literature. *Current Neurology and Neuroscience Reports*, this issue, <https://doi.org/10.1007/s11910-013-0420-x>. [4] Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., 2009. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, this issue, <https://doi.org/10.1371/journal.pmed.1000097>.

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