

Supremacy of Auditory Versus Visual Input in Empathic Arousal

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INTRODUCTION

- **Somatic Empathy (SM)** is a prosocial behavior which helps with human survival.
- SM is generated in circulation of sensory systems, mirror neuron, and a chain of brain centers: aMCC-dACC-SMA-bilateral AI .
- **Auditory inputs** and sensory system compared to visual is **dominant** to activate different section of this chain.
- Recently new types of *Mirror neurons*, which believed mediate the understanding of others experiences, **auditory** mirror neurons , and **audio-visual** mirror neurons have been discovered but it has not been investigated in terms of empathic arousal.
- Auditory system has more proper feature to arouse empathy in emergency situation.

TABLE II. Comparison Of Auditory And Visual Systems

Subject of Comparison	Auditory System	Visual System
Secondary System	Not Dependent	Luminance
Interaction with Objects	Passes Through Objects	Reflect from Surface
Signal Features	Simple and Fast	Complex and Slow
Location & Direction in Darkness	Accurate Function	Low or No Function
Signal Reception Spectrum	360 Degree of Surrounding Area	Less Than 180 of Front Area
Registration to Brain	1000 Events Per Second	15 to 25 Events Per Seconds
Function During Sleeping	Active	Dysfunction

The present study compared auditory and visual presentation in the evocation of somatic empathy, with the expectation that auditory information would evoke higher empathy compared to visual information

METHODS

Subjects: College students (N = 125) Participants were randomly assigned to one of three conditions

Materials: a Questionnaire to indicate: perceived pain, the level of danger , experienced any physical sensations during the presentation, empathic quotients test (Baron- Cohen), and demographic data.

Procedure : Three separate versions of a 40 seconds digital file (i.e., audio-only, video-only, or audio-video file) which was presenting an elderly man suffering from a painful kidney stone presented to the participants in different groups.

RESULTS

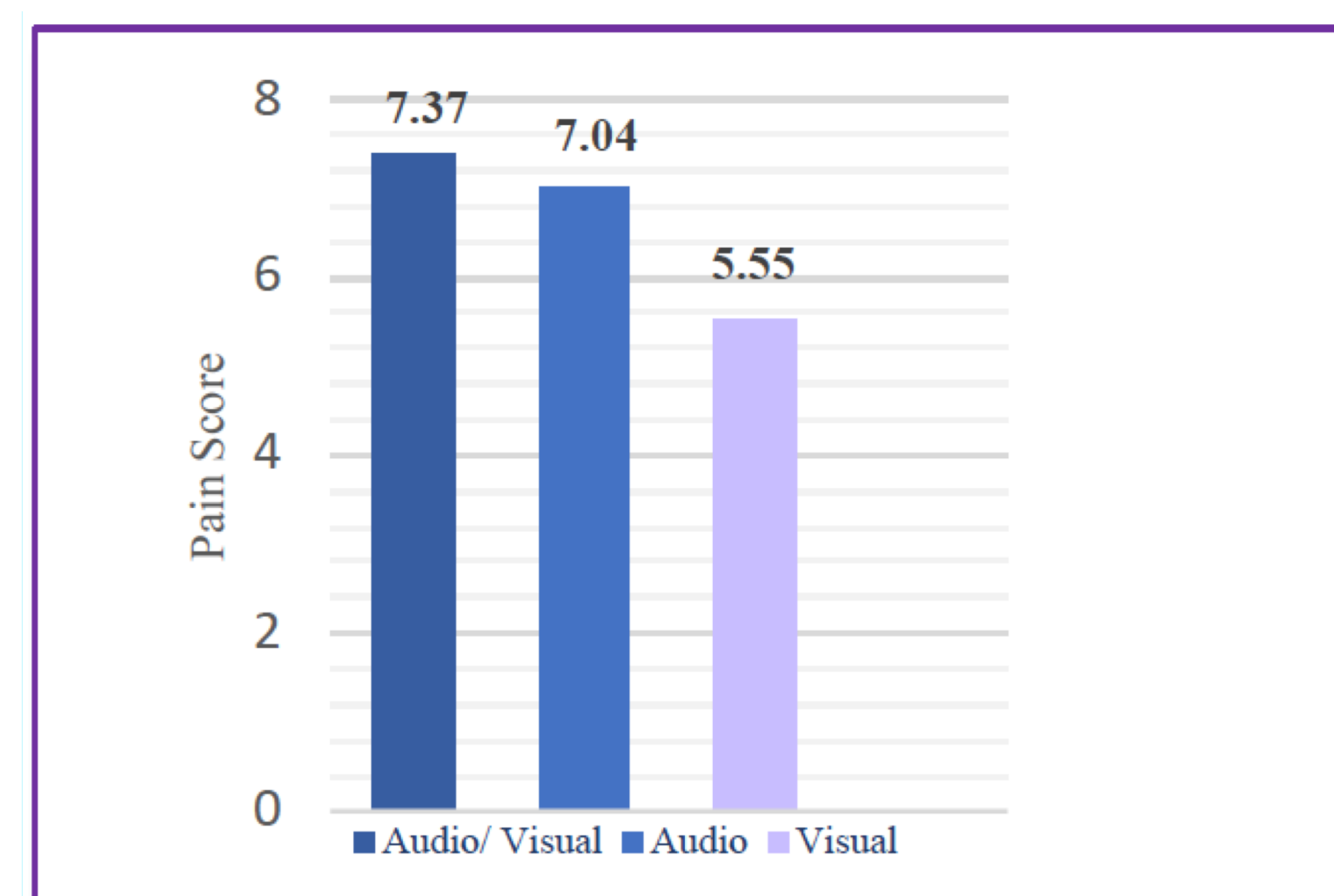


Figure 1. Displayed mean based on type of digital file.

- The results were similar for the estimates of patient danger, although not significantly so.
- Those in the audio-only and audio-video groups experienced more sympathetic pain sensations compared to those in the visual-only group

TABLE II. Number of Reports of Each Group at Different Levels

Group	Slightly Sensed (+1)	Somehow Sensed (+2)	Strongly Sensed (+3)	Total
Audio/Visual	11	1	2	14
Audio	7	2	2	11
Visual	1	1	1	3

- Reports of sensation location and type sensation are close for Audio/Visual and Audio groups, and both are distinct from the Visual group. Also, these reports and highly related, and in some cases very accurate, to what and where a kidney stone might cause in a patient who is actual.

TABLE III. Location and Type of Sensation For Each Group At Different Level.

Group	Slightly Sensed (+1)	Somehow Sensed (+2)	Strongly Sensed (+3)
Audio/ Visual	Middle Back Body Tighten Chest Nauseous Lower Abdominal Knee Weird Feeling	Anxiety Stomachache	Heart Solar Plexus Knee
Audio	Stomach Nausea Stress Stomachache Chest Back	Chill Down Spinal	Chase Leg Hotness in Back
Visual	None	None	None

CONCLUSION

- Results suggest the supremacy of the auditory system over the visual system for evocation of empathic arousal, especially empathic concern.
- Input from the auditory system plays a significant and dominant role compared to other sensory systems in the evaluation of pain, dangerousness of a situations, other's sensations.