THE VISUAL CORTICAL EXCITABILITY IN PEDIATRIC MIGRAINE AS TESTED BY SOUND-INDUCED FLASH ILLUSIONS

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INTRODUCTION: Sound-induced flash illusions (SIFI) depend on visual cortex(V1) excitability(1). In adults with migraine, in response to visual-acoustic illusions, V1 is hyperexcitable(2). Susceptibility to SIFI is increased in children than adults. During childhood there is a change in sensory dominance: acoustic dominant switching to a visual(3). Here we used SIFI to evaluate V1 excitability in children with migraine assessing also age-related differences in cross-modal audio-visual perception.

MATERIALS: Twelve children(7 females) affected by migraine without aura; mean age: 10.17±2.76 years, disease duration: 2.91 ± 2.34 years and attacks frequency: 4.17 ± 3.76 /months;
Fifteen healthy children(11 females), mean age 10.61±2.92 years and twenty-four healthy adult(12 females), mean age 25.12±5.74 years with no familiarity for migraine. All subjects were not taking any drugs known to affect cortical excitability. Migraineurs were examined interictally.

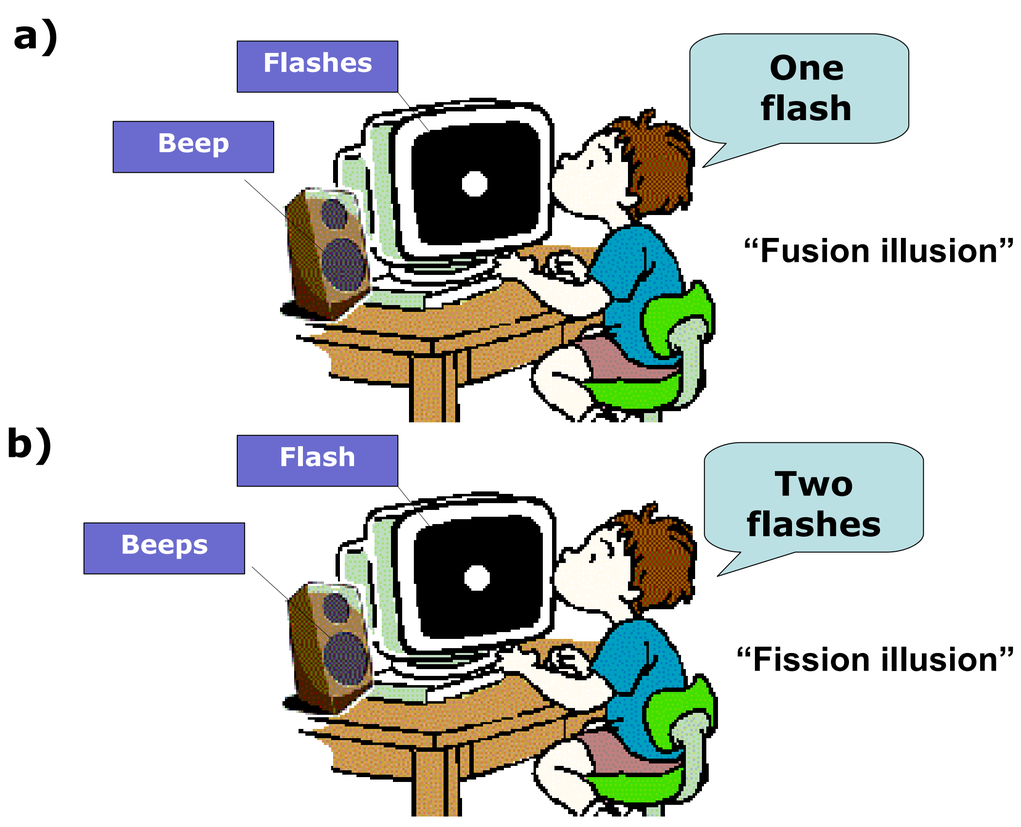

Figure 1: Visual (flash) and sound (beep) stimuli are presented with different combinations: multiple flash trials where a single beep causes the perception of less flashes, "fusion illusions" (a) and trial where multiple beeps with single flash, induce perception of more flashes, "fission illusion"(b). Each combination was randomly presented 10 times. At the end of each presentation the subject had to indicate the number of the flashes seen.

RESULTS: Children see more illusions than adults (fusions $p<.005$, fissions $p<.00001$). Children with migraine do not differ from age matched control in the illusory percept of fission or fusion, but they perceive more flashes ($p<.05$) in multiple flash trials with or without beep(Fig.2 a, b).

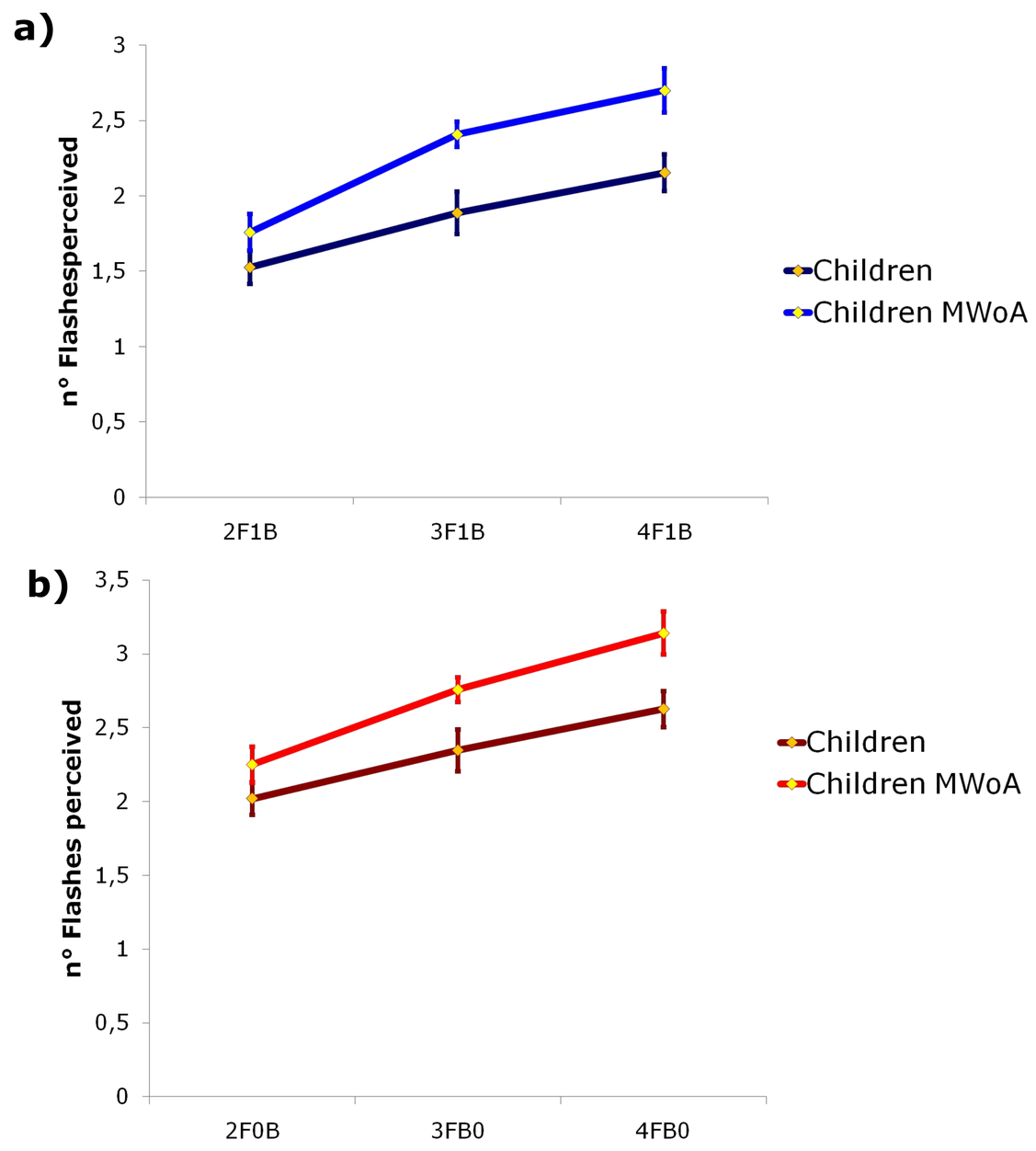

Figure 2: Flash seen with (a) and without beep (b).

CONCLUSIONS: The increased number of SIFI saw by children is likely due to the higher propensity of visual stimulation to be driven by auditory stimulus. This likely because of acoustic dominance typical for the age. Even if no difference in fission or fusion illusory percept between controls and patients emerge, the increased ability of migraine children to perceive flashes, even outside migraine attack, reveal a hyper-functional visual cortex in migraine also in pediatric age. The sound-induced flash illusions proved to be a valid tool for testing the visual cortical responsivity in pediatric migraine.

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