

## ***BEHAVIORAL AND COGNITIVE EFFECTS OF ELECTROMAGNETIC FIELD EXPOSURES***

**Johnston Sheila**

Neuroscience, Neuroscience Consultant, 10 Queens Mews, London, London, UK  
W2 4BZ

This review [1-2] will cover both archival and newer scientific literature concerned with ELF & MW exposure effects on human and laboratory animal perception, performance disruption, and effects on cognitive performance. The scientific literature will be discussed and related to safety standards [3-5]. Studies overall are inconsistent and difficult to interpret with regard to possible health risks. Statistically significant differences between field and control exposures, when found, are small, subtle, transitory, without any clear dose-response relationship and difficult to confirm. A major problem has been the lack of reproducibility of effects. This is a difficult problem and is illustrated in the attempted replication studies described. This outcome is familiar to many authors for the failure to replicate chronic exposure studies described. More important, is the concept that weak MW cognitive effects will be difficult to detect and will randomly produce spurious results in experiments with insufficient statistical power to detect such effects. Cognitive tasks performed during MW or ELF exposures do not seem to be more sensitive than other behavioural measures.

1. D'Andrea, J.A., Chou, C.K., Johnston, S.A., and Adair, E.R. Microwave Effects on the Nervous System. Bioelectromagnetics Supplement 6:S107-S147, 2003.
2. NRPB, Review of the Scientific Evidence for Limiting Exposure to Electromagnetic Fields (0–300 GHz) Documents of the NRPB 15 No.3, 2004.
3. IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0 to 3 kHz. IEEE Standard C95.6-2002. The Institute of Electrical and Electronic Engineers, New York, 2002.
4. IEEE C95.1-1991, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, 1999 edition.
5. ICNIRP International Commission on Non-Ionizing Radiation Protection “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields up to 300 GHz,” Health Physics, vol. 74, pp. 494 – 522, 1998.