Recently we obtained a surprising result that bears important consequences to this question. We have found that there is an orderly map of retinal eccentricity (distance from the fovea) in high order object representations. Interestingly, different object categories show a different level of association with this eccentricity map. In particular, faces show a consistent association with central (foveal) visual field bias, while houses show an association with peripheral visual field bias. What could be the source of such differential association?

We hypothesize that this organization is related to resolution demands, i.e. object images whose analysis requires fine detail (e.g. faces) will be associated with foveal representations, which specialize for fine analysis, while object images that depend on large scale integration (such as houses) will be associated with low resolution, peripheral representations.

One prediction stemming from this hypothesis is that letters and words should be selectively associated with central-biased representation since reading is a highly resolution-dependent and foveal task. Indeed, our results clearly show such association. This association is not a common property of all object images since another object category (tools) did not show such selective association. Thus, our results demonstrate a new and unexpected principle of organization of human object areas, which can put in a coherent framework much of the previous findings in these areas.
To conclude, functional mapping of the human brain using MRI has allowed us to study in great detail an important part of the human visual cortex involved in visual processing. Our results begin to outline the neuronal principles by which the retinal image is gradually converted to a precise model of the outside environment.

Selected Publications

Acknowledgements
Research in our lab is supported by grants from: the Nella and Leon Benoziyo Center for Neurosciences, Israel Science Foundation 644/99; McDonnel-Pew 99-28 CNOJA.05; German-Israeli Bi National Science Foundation I-0576-040; and Israeli Academy-Center of excellence, 8003.