Anders M. Fjell
Department of Psychology, University of Oslo, Pb. 1094 Blindern, 0317 Oslo, Norway

Tel. +47 22845129
E-mail: andersmf@psykologi.uio.no ; k.b.walhovd@psykologi.uio.no
http://humancognition.org/index.php/anders-fjell

Anders Fjell is professor of cognitive psychology. He has a psychology degree from Oslo in 2001, is trained in neuropsychology, ERP techniques (with Reinvang) and MR morphometric analyses (with Anders Dale at Harvard) Together with Kristine Walhovd he obtained Ph.D in 2005 (Integrating brain and behavior throughout the adult life-span). They now jointly lead a research program in Oslo to study the biological foundations of life-span changes with multiple methods, collaborating with a network of Norwegian and foreign reasearchers.

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BRAIN AND COGNITION THROUGH LIFESPAN - DEVELOPMENTAL AND AGE RELATED CHANGES IN THE BRAIN

ANDERS M. FJELL

Presentation Sunday 13.00-16.00

The brain undergoes continuous change across the life-span. While the rate of change is much larger in the first few years of life, alterations in brain structure and function are seen in healthy individuals also in adulthood. However, different parts of the brain show very different life-span trajectories. Some areas mature early in life, e.g. primary sensory areas, especially visual cortex, and also show less age-related change. Other structures mature late, e.g. cortical association areas and prefrontal areas. Some of these late-maturing areas show large decline in higher age, an observation which has given rise to the so-called “last-in, first-out” hypothesis. It has even been suggested that old age is characterised by retro-genesis, that is, an inverse developmental pattern. This hypothesis will be discussed critically. Another interesting feature about brain development and aging is the very different trajectories shown by white matter and cortical gray matter.

Contrary to a commonly held belief, recent neuroimaging studies show that cortical thickness decreases almost linearly in healthy elderly from 5-6 years to very high age. White matter, o the other hand, continues to grow in volume well into middle age. Also the microstructure of white matter, which can be measured with diffusion tensor imaging, continues to develop well into adulthood. Some researchers have suggested that the protracted growth of white matter may contribute to increased intellectual abilities into middle-age. This is an interesting hypothesis, which will be addressed in the workshop. A central topic of the workshop will be the cognitive consequences of the structural brain changes that are seen. To what extent does the evidence indicate a close structure-function relationship for the developing and aging brain?