DANCE THERAPY FOR COGNITIVE ENHANCEMENT IN THE ELDERLY

By Jan C. Kattenstroth, Tobias Kalisch, Martin Tegenthoff and Hubert R. Dinse

Our work focuses on the functional relevance of neural plasticity and the possibility of modulating plastic processes for augmenting sensorimotor and cognitive performance. Here we report our studies on aging processes and the impact of age on perception and brain organization under the premise that age-related changes are not a simple reflection of degenerational processes, but a complex mix of plastic and adaptive compensatory mechanisms (David-Jürgens et al., 2008; Dinse, 2006; Dinse et al., 2006; Dinse et al., 2009; Godde et al., 2002; Kalisch et al., 2008; Li and Dinse, 2002). Our data from animal models and in human elderly make a strong point that age-related alterations are not irreversible but treatable. Given the dramatic changes the industrialized countries undergo in respect to their aging structure, these findings are of utmost relevance.

Starting point for addressing the efficacy of dancing in the context of rehabilitation were previous findings from our lab where we showed that housing aged rats under enriched environmental conditions delayed and ameliorated age-related deterioration of somatosensory cortex and sensorimotor behavior (Dinse, 2006; Godde et al., 2002; Hilbig et al., 2000; Hilbig et al., 2002; Hilbig et al., 2007). Enrichment is believed to present animals with increased sensory, motor, and cognitive demands and to reinforce a variety of behavior including learning, social interactions, physical activity and exploration. By that a wide range of morphological, molecular and physiologic features of the brain is affected.

In search for equivalent enriched environments for elderly humans, we began studying the impact of long-year regular dancing in a group of neurologically healthy elderly subjects (aged 65 to 84 years) and compared the outcome to a group of aged

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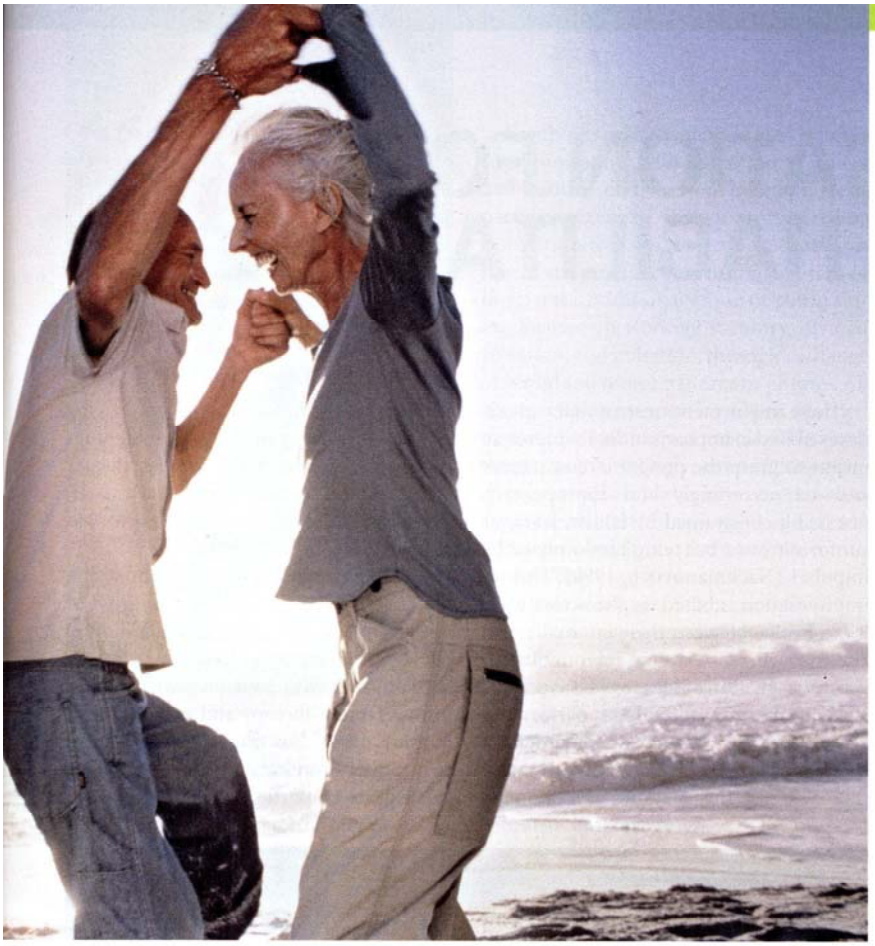

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and education-matched subjects that had no record of regular dancing, exercising or work out activities. Dancing was selected because it comprises beyond simple physical exercise emotional, social, acoustic, musical and affective features.

In order to obtain information about the possible scale of effects, we performed a broad assessment consisting of neuropsychological and intelligent tests, psychophysical and sensorimotor tests and recordings of SEPs (somatosensory evoked potentials). The idea was to cover very basic and simple measures of performance as well as rather complex tasks with high cognitive demands.

Surprisingly, in all of the different tests investigated, the group of dancers showed a superior performance as compared to the non-dancer control group. Our data indicated that elderly subjects with a long-year regular schedule of dancing show superior performance across a variety of simple to difficult tasks including sensory, motor and cognitive performance (Kolankowska et al., 2007).

We currently extend these studies to a subpopulation of elderly persons that have no record of either dancing or sporting activities to address the question, whether the superior performance in elderly dancers is due to the dancing activity itself, or whether a specific subpopulation characterized by unusual fitness chooses an active lifestyle including dancing activities, thereby outperforming the group of non-dancers. For that purpose we offer a 6 months professional dance course, while testing mental and physical performance before, during and after the course, the results of that study will be available during 2009.

Our data show that those intervention measures are particularly effective to augment sensorimotor and cognitive abilities that utilize environmental factors to enforce neuroplasticity mechanisms.

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