

# **Education in 21<sup>st</sup> Century America:**

## **A Waltz With the Scarecrow**

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### *Ten Points for Change*

1. Begin to think of education and learning as a method for health, no different than exercise or nutrition. For the new millennium, learning and information (mental exercise) is the conduit to brain wellness as physical exercise is for cardiac health.
2. Our educational system should accentuate curriculum that enhances language and verbal skills. Language is highly correlated with overall intelligence, and increasing one's IQ early in life may help to prevent late life neurodegeneration. Language itself may have a prominent role in health and wellness.
3. Learning must be considered a continuous process and not a fixed stage. Continuous lifelong learning must be reinforced from embryonic development to the latter stages of life. We now know there are two critical periods of neuronal development: infancy and teenage years. A third critical period may exist in middle to later adulthood.
4. Early communication, verbal and nonverbal, between mother/father and developing child in the womb is important as it may lay the foundation for human interaction and foster a stimulating environment.
5. Environments for our children must be safe, stimulating, challenging, and nurturing. This is the case for the home and for day care centers across the country. Brain development in childhood is tremendous, and there is relatively little a child's brain cannot ascertain. These early experiences help to prepare the brain for new learning on more complex levels with advancing age. Our preparation to maximize intelligence and brain capacity is a health care issue.

- Every neighborhood should have immediate access to a library or school. New neighborhoods could be built with the school and place of worship at the epicenter. A school should be built in the middle of every ghetto and slum. Churches in the inner city and in rural America should be equipped with the internet to link older adults to information.
6. Our educational system must be seen as a place to maximize lifelong health, not simply a time-limited setting for completing a diploma. The 12 year (9 month) school experience might not be appropriate if we view the school as a wellness center. Adults and older adults must remain connected to the educational system of our country. New learning and development of new skills translates into brain development and brain health.
  7. Our health insurance companies need to re-think how the money is spent for maintaining health. I would argue that education and measurable learning across the lifespan should be incentivized financially in the same way that an exercise routine is. Imagine your health insurance provider paying for your education with the purpose of preventing a progressive disorder late in life which may cost three times as much. It is significant to note that more older Americans are returning to college than ever before!
  8. Curriculum on aging should be incorporated in all school systems across the country. As aging is a national issue, we must begin teaching our children how to age successfully. Topics such as financial planning, nutrition, education, and occupation can be presented as important factors to a long and healthy life. Teachers may even be recruited from older persons who are now aging

successfully as research indicates that children like to have older adults in the classroom.

9. Our school systems must begin to think beyond education and redefine their missions as health facilitators. A school building can literally become the wellness center for the 21<sup>st</sup> century with a focus on learning, mental stimulation, and brain health. It likely has as much to offer in maintaining health and preventing illness across the lifespan as any primary care physician's office.
10. Consumers of health services must demand more than our current options for wellness. We must encourage health insurance payers and policymakers to recognize the importance of education, religion, role and purpose, housing, and transportation to our health. Funding of such social needs will demonstrate a commitment to real wellness, and may be covered by existing money which is funding antiquated programs. We can measure the impact of such an approach to health and wellness, and determine the economic and quality of life outcomes compared to what we have now.

## Bibliography

- Albert, M. (1995). How does education affect cognitive function? Ann Epid, 76-78.
- Bassuk, S. S., Glass, T. A., & Berkman, L. F. (1999). Social disengagement and incident cognitive decline in community dwelling elderly persons. Annals of Internal Medicine, 131, 165-173.
- Beard, C. M., Kokmen, E., Offord, K. P., & Kurland, L. T. (1992). Lack of association between AD and education, occupation, marital status, or living arrangement. Neurology, 42, 2063-2068.
- Bjornson, C. R., Rietze, R. L., Reynolds, B. A., Magli, M.C., Vescovi, A. L. (1999). Turning brain into blood: A hematopoietic fate adopted by adult neural stem cells in vivo. Science, 283, 534-537.
- Blumenthal, J., Jeffries, Castellanos, F. X., Liu, H., Zijdenbos, A., Paus, T., Evans, A. C., Rapoport, J. L., & Giedd, J. N. (1999). Brain development during childhood and adolescence: a longitudinal MRI study. Nature Neuroscience, 2, 861-863.
- Christensen, H. et al (1993). The association between mental, social, and physical activity and cognitive performance in young and old subjects. Age, Ageing, 22, 175-182.
- Cobb, J. L., Wolf, M. D., Au, R., White, R., & D'Agostino, R. B., (1995). The effect of education on the incidence of dementia and AD in The Framingham study. Neurology, 45, 1707-1712.
- Eriksson, P., Perfillieva, E., Eriksson, B. T., Alborn, A. M., Nordborg, C., Peterson, A. D., & Gage, R. H. (1998). Neurogenesis in the adult human hippocampus. Nature Medicine, 4 1313-1317.
- Evans, D. A., Hebert, L. E., Beckett, L. A., Scherr, P. A., Albert, M. S., Chown, M. J., Pilgrim, D. M., & Taylor, J. O. (1997). Education and other measures of socioeconomic status and risk of incident AD in a defined population of older persons. Arch Neurol, 54, 1399-1405.
- Fabrigoule, C., Letenneur, L., Dartigues, J. F., Zarrouk, M., Commenges, D., & Gateau, P. B. (1995). Social and leisure activities and risk of dementia: A prospective longitudinal study. Journal of the American Geriatrics Society, 43, 485-490.
- Fielding, R. A. (1996). Effects of exercise training in the elderly: impact of progressive resistance training on skeletal muscle and whole body protein metabolism. Proceedings of the Nutrition Society, 54, 665-675.
- Fisher, B. J. (1995). Successful aging, life satisfaction, and generativity in later life. International J. Aging and Human Develop, 41, 239-250.
- Gould, E., Beylin, A., Tanapat, P., Reeves, A., & Shors, T. J. (1999). Learning enhances adult neurogenesis in the hippocampal formation. Nature Neuroscience, 2, 203-205.
- Greenough, W. T., Cohen, N. J., & Juraska, J. M. (1999). New neurons in old brains: learning to survive? Nature Neurosciences, 2, 260-265.

- Jorm, A. F. (1997). AD: risk and protection. MJA, 20, 443-446.
- Jorm, A. F., Rodgers, B. A., Henderson, S., Korten, A. E., Jacomb, P. A., Christensen, H., & Mackinnon, A. (1998). Occupation type as a predictor of cognitive decline and dementia in old age. British Geriatrics Society, 27, 477-483.
- Katzman, R. (1995). Can late life social or leisure activities delay the onset of dementia? Journal of the American Geriatrics Society, 43, 583-584.
- Kempermann, G. H., Kuhn, G., & Gage, F. H. (1997). More hippocampal neurons in adult mice living in an enriched environment. Nature, 386, 493-496.
- Kotulak, R. (1997). Inside the brain. : Kansas City: Andrews Mcmeel Publishing.
- Leibovici, D., Ritchie, K., Ledesert, B., & Touchon, J. (1996). Does education level determine the course of cognitive decline? Age and Ageing, 25, 392-397.
- MacRae, P. G. (1987). Endurance training effects on D2 dopamine receptor and striatal dopamine metabolism in presenescent older rats. Psychopharmacology, 92, 236-240.
- Martin, P. (1996). Social and psychological resources in the oldest old. Experimental Aging Research, 22, 121-139.
- Moceri, V. M., Kukull, W. A., Emanuel, I., Van Belle, G., & Larson, E. B. (2000). Early-Life risk factors and the development of Alzheimer's disease. Neurology, 54, 415-421.
- Moore, M. (1999). Turning brain into blood-clinical applications of stem cell research in neurobiology and hematology. The New England Journal of Medicine, 341, 605-607.
- Mortimer, J. A. (1997). Brain reserve and the clinical expression of AD. Geriatrics, 52, S50-S53.
- Nathanielsz, P. W. (1999). Life in the womb: the origin of health and disease. New York: Prometheus Press.
- Neeper, S. A. (1995). Exercise and brain neurotrophins. Nature, 373, 109.
- Nussbaum, P. D. (1999). The enlightened gerosphere: A prescription for education and wellness in the 21<sup>st</sup> century. Responses, Fall, 11-13, (Florida Council on Aging).
- Nussbaum, P. D. (1997). Handbook of neuropsychology and aging. New York: Plenum Press.
- Perls, T. T. (1995). The oldest old. Scientific American, 70-75.
- Plassman, B. L., Welsh, K. A., Helms, B. S., Brandt, J., Page, W. F., & Breitner, J. C. S. (1995). Intelligence and education as predictors of cognitive state in late life. Neurology, 45, 1446-1450.
- Schmand, B., Lindeboom, J., Hooijer, C., & Jonker, C. (1995). Relation between education and dementia: the role of test bias revisited. Journal of Neurology, Neurosurgery, and Psychiatry, 59, 170-174.

- Schmand, B., Smit, J. H., Geerlings, M. I., & Lindeboom, J. (1997). The effects of intelligence and education on the development of dementia. A test of the brain reserve hypothesis. Psychological Medicine, *27*, 1337-1344.
- Schmand, B., Smit, J. H., Lindeboom, J., Smits, C., Hooijer, C., Jonker, C., & Deelman, B. (1997). Low education is a genuine risk factor for accelerated memory decline and dementia. J. Clin. Epidem., *50*, 1025-1033.
- Snowdon, D. A., Kemper, S. J., Mortimer, J. A., Greiner, L. H., Wekstein, D. R., & Markesbery, W. R. (1996). Linguistic ability in early life and cognitive function And AD in late life; Findings from the nun study. JAMA, *275*, 528-532.
- Snowdon, D. A. (1997). Nun study: brain infarction and expression of AD. J. Amer Med Assoc., *277*, 813-817.
- Stern, Y., Alexander, G. E., Prohovnik, I., & Mayeux, R. (1992). Inverse relationship between education and parietotemporal perfusion deficit in AD. Annals of Neurology, *32*, 371-375.
- Stern, Y., Gurland, B., Tatemichi, T. K., Tang, M. X., Wilder, D., & Mayeux, R. (1994). Influence of education and occupation on incidence of AD. JAMA, *271*, 1004-1010.
- Stern, Y., Alexander, G. E., Prohovnik, I., Stricks, L., Link, B., Lennon, M. C., & Mayeux, R. (1995). Relationship between lifetime occupation and parietal flow: Implications for a reserve against AD pathology. Neurology, *45*, 55-60.
- Stern, Y., Tang, M. X., Denaro, J., & Mayeux, R. (1995). Increased risk of mortality in AD patients with more advanced educational and occupational attainment. Annals of Neurology, *37*, 590-595.
- Tang, Y. P., Shimizu, E., Dube, G. R., Rampon, C., Kerchner, G. A., Zhuo, M., Liu, G., & Tslen, J. Z. (1999). Genetic enhancement of learning and memory in mice. Nature, *401*, 63-69.
- V. Praag, H., Kempermann, G., & Gage, F. H. (1999). Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus. Nature Neuroscience, *2*, 266-270.

