Gods - Microsoft Internet Explorer
File Edit View Favorites Tools Help
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There are only two ways to live your life.
One is as though nothing is a miracle.
The other is as if everything is."
~Albert Einstein

$$\int_{Time=0}^{Time=\infty}\int_{Space=0}^{Space=\infty}\int_{Energy=0}^{Energy=\infty} E = mc^2$$

IS THE MIND OF GOD

If your thoughts are the thoughts of God, does this make you a God? Yes, we all are a portion or fragment if you will, of the Spirit. If we are fragments, this means we are a part of God, does it not?

The great religions on Earth tell you that you were created by God, but this is only a simplified version of who you really are.

All consciousness is God. This is not to say that you have the same or equal power with the prime Creator, but know that the Creator is part of you and you are a part of the Creator. You are one and the same, as all of creation is.

So, what would you like to CREATE today???

Discussions:

This fictitious story created for your education, has had all the names and places changed to protect the innocent.

[Up] [Our Evolution]
[Cain & Abel 33]
[Internet the Death]
[Mother Earth]
[I AM that I AM]
[God Conversations]
[BOOM!!!!]

"Never doubt that a small group of thoughtful citizens can change the world. Indeed, it's the only thing that ever has". - Margaret Mead

Done
Internet

OE Journal

From: Jermier, John
Sent: Wednesday, September 28, 2005 6:32 AM
To: O&E Journal
Subject: RE: Thank you for Tokyo Japanese Restaurant & Sushi Bar

Dear Eric,

You're welcome. I enjoyed dinner too. Very good conversation.

See you at the office.

John

-----Original Message-----
From: O&E Journal
Sent: Tuesday, September 27, 2005 9:45 PM
To: Jermier, John
Subject: Thank you for Tokyo Japanese Restaurant & Sushi Bar

Dr. Jermier,
Thank you very much for dinner tonight. I enjoyed it a great deal.

I feel like I have more work to do than ever, but I also feel very confident in what I'm doing. And your words of kindness and understanding were a great gift. I'm doing something that never has been done and desperately needs to be done. There are countless reasons for this, just as there are countless forces trying to stop me.

Yours is another voice of confidence which inspires me further. I know nothing can stop me. And I know I will always get the guidance I need… thanks ;-)

Here's the letter we went over http://www.starsusa.org/usffolder/July-letter.pdf with active links...
Here are some other related links for you:
http://www.starsusa.org/download/MayanChant.pdf
http://www.starsusa.org/scire/mayan.html

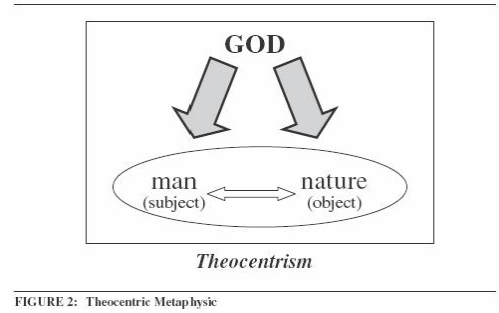
THANKS AGAIN!!!
Sincerely

Eric R. Weaver
Ed. Asst. Organization & Environment www.coba.usf.edu/jermier/journal.htm
College of Business, University of South Florida
Department of Management, BSN 3215
4202 East Fowler Avenue Tampa, Florida 33620
Telephone: 813-974-1757 Fax: 813-974-1734

Saturday, October 01, 2005

Dear Dr. USF:

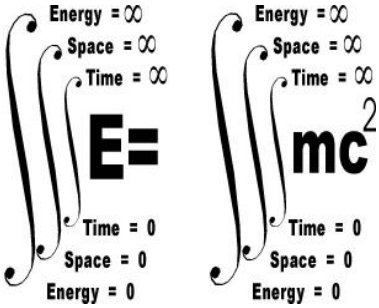
As you all know I have been exploring some theories[1] (links below). Since our last meeting I've been very busy completing all your recommendations. I have a new editing position[2] which gives me added resources to more fully study the current literature and to bring these theories to the forefront of modern scientific thought. Additionally I have a new research position compiling data for an integrative research project at Moffitt involving "Meditation Based Stress Reduction[3]."



Theocentrism

FIGURE 2: Theocentric Metaphysic

I've been employed to assist in editing an academic journal[2]. The first article inspired me further: GETTING RIGHT WITH NATURE Anthropocentrism, Ecocentrism, and Theocentrism[4] by Andrew J. Hoffman and Lloyd E. Sandelands of University of Michigan.



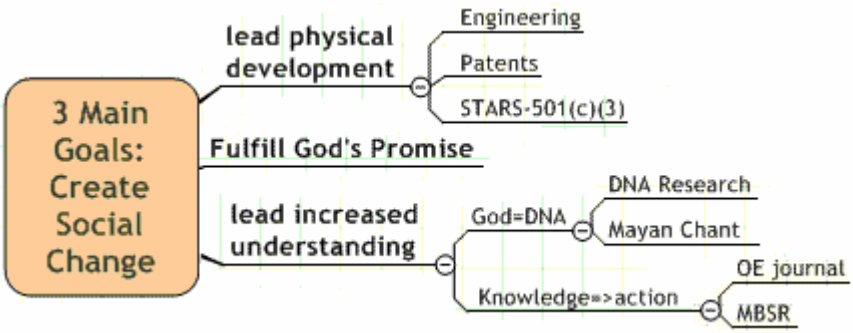
As you know I've got to develop my own research to demonstrate the understanding I have developed through my experiences[5] with God. This has evolved into the DNA Consciousness Theories which I've been exploring with various professors[6] on campus already.

Please keep these ideals in mind and feel free to direct any spontaneous insights in this regard to me immediately at BSN 3215; Telephone: 813-974-1757 eric@starsusa.org

The only recommendation from all of you that I've not done is visiting Dr. Sanberg.[6] Thank you very much for assisting me on this Mission with God![5]

Sincerely,

Eric R Weaver
813-679-5195 Cell



Web links:

1. The DNA Consciousness Theories
2. *The Organization & Environment* Journal
3. MBSR at Moffitt Cancer Center
4. GETTING RIGHT WITH NATURE Article
5. My experiences with God
6. USF Professors disclosed to

We consciously change the expression of our DNA all the time. We do it with fears, and Loves, words, deeds and even with the foods we eat and the TV we watch. Everything around us is internalized by our bodies whether we want to or not. There are methods to prevent this, just as there are methods to enhance this. This discussion is designed to lay the context for how we can enhance this. This is a significant method and therefore will provide significant quantifiable data for the scientific analysis of this.

Intellectual Merit

- How does this proposal fit into the science?
- How does this expand scientific knowledge?

Broader Impacts on Society

- How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
- To what extent does the proposed activity suggest and explore creative and original concepts?
- How well conceived and organized is the proposed activity?
- Is there sufficient access to resources?

Propose Theory

- Detail and specify the concept

Propose Experiment

- Detail and specify the experiment.
- Experiment procedures
- Control sample
- Expected results
- How can this be reproduced?

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Intellectual Merit *fit into science*

Related_Research_Articles	***Consciousness is making changes***
New Scientist Premium- X chromosome activity different in every woman - News	If Chromosomes switch on and off creating divergent populations, Do DNA Shift Expressions as easily?
New Scientist Life's top 10 greatest inventions - Features	The Brain is the most evolved expression of life on Earth, what more could evolve from it?
Tai Chi Helps Parkinson's Patients	Simple exercise and conscious applications can combat the effects of disease.
New Scientist Breaking News - TV may turn four-year-olds into bullies	Repeated symbols and observations can influence individual actions and choices.
Optimism associated with lowered risk of dying from heart disease	Conscious attitudes improve health, and can be used to help Shift DNA Expression.
Wired News: Neurons Derived From Stem Cells	IS stem-cells change focused on timing or is it the conscious choice involved?
The Endocrine Regulation of Aging by Insulin-like Signals	Pituitary signaling defines aging; but can we consciously choose to control these glands?
Sir2: scrambling for answers: researchers have yet to solidify links for the proposed longevity lynchpin.	Lifetime extensions are based on diet influences or is it the conscious choices that control chemical uptakes and reactions?
The Human Energy Field in Relation to Science, Consciousness, and Health	Masters practicing their meditative discipline to balance and invigorate the human energy field is now measurable.

Meditation Gives Brain a Charge, Study Finds	Mental discipline and meditative practice can change the workings of the brain and allow people to achieve different levels of awareness.
Depression as a Risk Factor for Mortality in Patients With Coronary Heart Disease	Do conscious attitudes improve health, can they Shift DNA Expressions?
Wired News: Dems, GOP: Who's Got the Brains?	Can conscious attitudes regulate natural body reactions to outside stimulus?
Wired News: Clear Pictures of How We Think	Science has developed enough to trace how we can consciously control ourselves.
The Scientist :: MicroRNA controls insulin	There is new information about RNA controls, but can we decide what our RNA controls more?

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expand scientific knowledge

A practice has been developed combining the various traditions including the Love of Jesus Christ, Taoist, Tantra, Wicca, Kabala, Reiki, Yoga, Meditation and other Hoppi and Mayan practices to create fundamental changes in our biological systems. Each of these ancient practices was designed to control and direct our evolution. This DNA Shift Experiment will reunite the fundamentals to abate disease, improve health and longevity.

Technology and science provides key measurements and definitive analysis for study of any changes proposed. This proposed research will create a specific reproducible experiment to create measurable changes in the biological systems of the participants. This will establish how certain practices can bring desired changes to our body chemistry, mind functions, and the expressions of DNA. This will be the DNA Shift Experiment.

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important advancing knowledge across different fields

Science has defined the thinking facility present in human beings. We only know mankind can reason, reflect and exercise judgment through controlling recordable communicative means. It is mankind who can compare and contrast, who can think of *pros* and *cons* and who can draw inferences and conclusions from these sufficient to share with others. Can these activities of the mind be the precursor to more advanced abilities? Is the Mind and Consciousness of people evolving?

Yes, the evolution of DNA and brain tissues continues every moment1?. If we look at the progression of mankind and mind, we find it practical to investigate how much more we are capable of completing by only using the mind. Demonstrating how consciousness can control the expression of DNA can change many issues for mankind. Diseases can be defeated by "learning" new ways of thinking. Learning to "think away diseases" can evolve our culture and society significantly affecting every scientific biological endeavor. Are we controlled by the mass-marketed greed of the big bio-business or are we prepared to take the power over our lives again?

1? Cell Vol. 119 pp. 1027-1040 (2004) by Dorus et.al.

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proposed activity explore creative and original concepts

Learning to “think away diseases” requires combining different techniques to regulate and control the mind and body simultaneously. Significant advantages are obtained by using common methods represented in many religions and natural pathetic practices. This experiment will establish a benchmark or the “ground zero” point of how these “conscious mind & feeling” techniques can work together. Changing the expression of DNA will function together to empower people as necessary for our evolution and open new exploration opportunities. Science is beginning to explore and find value in many ancient practices so it is essential to bring these activities into a greater creative expression. This proposed DNA Shift Experimental activity is necessary to bring these practices into direct standing within the scientific community.

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conceived and organized proposed activity

A sound professional sample selected with great care and diligence will prove to be a very significant element in substantiating this theory. Direct control over body growth and function is fundamental. The DNA Shift results data is will be very precise with a refined process. The current genetic variation of the culture is extreme already. It is fundamental to use a suitable sample where "DNA Expressions" can be reasonably mapped to allow for an equivalent comparison. We need to avoid comparing apples to oranges and be clear from the onset how we will proceed. All current DNA technologies should be used to enhance this data collections.

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sufficient access to resources

Currently the PI is in the program:

http://www.coba.usf.edu/programs/mba/index.html
http://www.entrepreneurship.usf.edu/

Active investigation for future collaborative research currently includes:

http://publichealth.usf.edu/gh/
http://www.coba.usf.edu/departments/management/programs/msm/program.html
http://hsc.usf.edu/medicine/biochemistry/msbioinfocompbiol.html

Possible participative researchers currently include:

http://www.math.usf.edu/~jonoska/
http://hsc.usf.edu/com/iop/cancer/litman.html
http://publichealth.usf.edu/gh/hkay/index.html
http://hsc.usf.edu/publichealth/gh/adebaldo/index.html
http://www.hsc.usf.edu/PSYCH/Faculty/staff_tan.html

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Detail and specify the experiment

1. Schedule a public yoga class;
2. Outline the process and procedure for the class and Shift Experiment;
3. Disclose full details with required Experiment releases;
4. Initiate classes after obtaining notarized releases; Continue for a minimum of 6 months, with 30 day samples, reviews and surveys of participants until 200 complete samples are obtained.

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Experiment procedure

1. Complete application process, physical and all provided releases;
2. Inner Smile;
3. Orbit meditation;
4. Healing sounds;
5. Mudra of light;
6. Kundalini yoga;
7. Combine drums, dress, power traditions, prayers, and symbols to create the full visualization experience of the chant; Complete samples, exit interviews and surveys.

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Ideal Control sample

Required sample of 12 male and 12 female 20-40yr old residents: physically fit, no medications, no surgery, no handicaps. For best results participants should be as uniform as possible, the same culture, class, ethnicity and living environment to reduce initial genetic differences. Ideally control group should be all from a single family, neighborhoods, profession or the like. Each one must submit to full physical, a drug test, and provide a signed release for video and publication to enter 6 month research. Requires blood samples for DNA tests. Ideal candidate would be a college students interested enough to journal and document the experience as much as physically possible.

This ideal sample sets “ground zero.” All participants will experience beneficial results for the lessons and practices learned. However, the Shift Experiment will generate significant controversy and therefore will greatly benefit from having results from the ideal participants. Each variation brings a point for debate.

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A. Expected results

DNA SHIFT: Ideally people will be instructed to find an AGE and shift to that, shift from a disease or other ailment. There is a great variation in how this could be expressed. Simple expressions maybe undertaken at first, including for example the conscious increase in melatonin.

Participants will have to be very careful when learning this, and to have everyone state out loud what they are changing inside of themselves. The Chant power comes up, instruction will be to direct everyone to say out loud how they are changing the expression of their own DNA. Specific science lessons describing, for example, what melatonin secretions “look like,” how they can benefit, and what other related experiences will be fundamental to understanding how to Shift DNA.

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Can this be reproduced

Practical reproduction is done all the time already. During this experiment a more detailed journal of the events and activities will be kept. This will record any modifications that will enhance or improve the future replication.

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"Each time I watch it I get deeper into the experience and find more energy moving inside of me"
- Anonymous

Please visit the Mayan chant discussion group

Click to join the Mayan chant group

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Mayan Chant

Purpose

This group will study the process and steps taken to connect Heaven and Earth as the Ancient Mayan Priests did to regenerate their people's Karma so they could stay on Earth without burning up. Each move and sound is significant and worth imitating, following and/or understanding for the best experience & benefits.



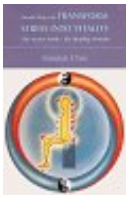
Symbols

1. 1st Vision
2. Reiki Symbols
3. 4 Directions Symbols
4. 5 Points
5. Mayan Glyph Gift

Learn it now

Lessons3-5	Buy Now
Lessons6-8	Buy Now
Lessons9-11	Buy Now

WARNING !!!
Get Cleared before you try it !
Taoist Clearing (book)
These techniques were practiced daily for several MONTHS BEFORE the Mayan Chant started.



Discovery 1 list post Another list post Numbers

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MAYAN CHANT



Stay as long as you can
Please keep very silent to avoid interrupting anyone

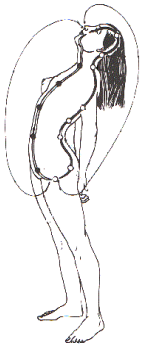
PROCEDURE: This chant is a process taken to connect Heaven and Earth. The Ancient Mayan Priests did this to regenerate their people's Karma so they could stay here on Earth without burning up. Each move and sound is significant and worth imitating, following or understanding for the best experience & benefits.

The Chant begins with the Lords Prayer:

Our Father, Who art in heaven
Hallowed be Thy Name;
Thy kingdom come,
Thy will be done,
On earth as it is in heaven.
Give us this day our daily bread,
And forgive us our trespasses,
As we forgive those who trespass against us;
And lead us not into temptation,
But deliver us from evil
For thine is the Kingdom and the Power and the Glory forever.
Amen

Several symbols are defined to honor the four quarters and the elements.
East Air South Fire West Water North Earth





This is followed by Chi Kong / Reiki movements to bring the Energy of the Heavens down through the Temple of the Body... through each individual chakra within the Microcosmic Orbit.

©2003 Eric R. Weaver

These movements begins with catching the energy of the heavens





This energy is then pushed through the body and brought through each chakra

This energy is brought down into the earth



And finally it's brought back up to the heavens



Many different Chants come out during this process: Om Prema Om, Om KaliKayai Namaha, Om Kam, Om Ram ...

I am Light within without;
I am Light is all about;
Fill me, Free Me, Verify Me;
Seal Me, Heal Me, Glorify Me;
Until transfigured they describe me;
I Am shining like the sun;
I AM Shining like the Son.



Often I feel as light as air, the sounds blow through me into the Heavens. The Channel between Heaven and Earth is opened up Strong for me to feel!

This link shows where this chant was found:http://starsusa.netfirms.com/mayan/
Please Join the discussions to share your experiences and Help in the growth and healing of the Earth http://groups.yahoo.com/group/MayanChant/message/2

Write or Call for additional showings times and / or Private screenings:
Chant@starsusa.org
Phone (813) 237-3705
Fax (813) 237-3710

Natasha Jonoska



Ph.D., 1993, State University of New York at Binghamton

Areas of interest: Biomolecular computation, symbolic dynamics, formal languages

E-mail: jonoska -at- math.usf.edu
Phone: (813)-974-9566
Fax: (813)-974-2700

Treasurer: **ISNSCE:International Society for Nanoscale Science, Computation and Engineering**

Associate Professor,

Graduate Admissions Director

- Mathematics Graduate Program
- Masters degree in Bioinformatics

Department of Mathematics,

University of South Florida

Cancer Biology Ph.D. Program at Moffitt

Faculty

University of South Florida USF



Gary Litman, Ph.D.
Professor in the Department of Pediatrics, College of Medicine

E-mail: litmang@allkids.org
Phone: (727) 553-3601

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Entire Handbook

Training

Undergraduate, University of Minnesota, Minneapolis
Ph.D., University of Minnesota, Minneapolis

Research Interests

Studies in our laboratory are directed at understanding both the mechanisms that diversify the adaptive immune response and the basis for variation in novel immune-like receptors that effect innate immunity. A number of different species that occupy significant positions in the evolutionary radiations of vertebrates are employed in these investigations, including: representative jawless vertebrates, cartilaginous fish as well as zebrafish, pufferfish and Xenopus. Current work is directed at understanding the origins of genes and gene products that regulate the differentiation of lymphoid lineages. Novel immune-type receptor genes that possess features of known mediators of both cellular and humoral immunity have been identified in the compact genome of pufferfish as well as in zebrafish. In the latter species, the genes have been localized to a chromosomal region that does not correspond to the region encoding the lymphoid receptor complex in mammals. Function of the novel genes is being examined by transfecting recombinant constructs into mammalian natural killer cell lines. Computer-based strategies are being developed to identify homologous genes in mammalian genomes. Additional studies are directed at refining methods to discover novel genes that are critical to cell regulatory pathways. Investigations of the expression of these genes and the function of their respective products utilize a variety of approaches including: characterization of interactions with specific nucleotide sequences and protein molecules, in vivo RNA injection into Xenopus blastocysts, knockdown strategies in zebrafish, and target gene disruption in mice.

Heidi Kay, Ph.D.

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Joined COPH Faculty: 2002

Assistant Professor

Contact Information:

Office: CPH 1112
E-Mail: hkay@hsc.usf.edu
Phone: (813) 974-6408
FAX: (813) 974-8506

Discipline:

Global Health

Specialization:

Water Chemistry
Cancer Drugs
Education
Kinetics
Photochemistry

Degrees:

B.S., Chemistry, University of South Florida, 1988
Ph.D., Chemistry, University of South Florida, 1999

Other Information:

Publications
Curriculum Vitae (PDF File - 106 KB)
Research & Support
Courses Taught
Links of Interest
The USF EnviroVan
The Kay Lab

Heidi Kay collaborates with Chemical Engineering, Chemistry and the Moffitt Cancer Center in research activities. Materials development, degradation of pollutants, solution kinetics and cancer drug design are ongoing projects. She conducts undergraduate research opportunities and has developed a mobile laboratory for education and research applications. Courses taught at COPH include Water and Wastewater lab and Instrumental Methods of Analysis.

Department of Global Health • USF College of Public Health
13201 Bruce B. Downs Blvd., MDC 56 • Tampa, FL 33612
Phone (813) 974-1122 • FAX (813) 974-8506

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Tampa, Florida 33612
This page was last modified on 1/26/2005.

Psychiatry & Behavioral Medicine

The USF College of Medicine



Jun Tan, M.D., Ph.D.

Assistant Professor

Contact Information

MRC14-361,
3515 East Fletcher Avenue
Tampa, Florida 33613
Telephone: (813) 974-3985
Fax: (813) 974-3915
jtan@hsc.usf.edu

Education

1978-1983 M.D. training (B.Ms.), Medicine, Third Military Medical
University, Chongqing, China
1987-1989 M.S., Human Genetics, Institute of Genetics of Fudan University, Shanghai, China
1990-1992 Ph.D., Immunology, Third Military Medical University,
Chongqing, China
1994-1996 Post-Doc., Department of Medical Microbiology and Immunology, University of Michigan Medical School, Ann Arbor, Michigan, USA
1996-1998 Post-Doc., Immunology Program, H. Lee Moffitt Cancer Center & Research Institute, University of South Florida College of Medicine, Tampa, Florida, USA

Interests

Role of CD40-CD40L interaction in Aß-mediated microglial activation and amyloidosis *in vivo* (a mouse model of Alzheimer's disease); effects of CD40 signaling pathway on metabolisms of amyloid precursor protein (APP); role of CD45, protein tyrosine phosphatase (PTP), in negative regulation of microglial activation; the functional role of CD40 isoforms in neuronal cell proliferation and differentiation

Publications

1. Tan J, Town T, Mori T, Wu Y, DelleDonne A, Obregon D, Rojiani A, Crawford F, Flavell R, Mullan M. CD40 is expressed and functional on neuronal cells. EMBO J 21 (4): 643-652 (2002).
2. Tan J, Town T, Mullan M. CD45 inhibits CD40L-induced Microglial Activation via negative regulation of the Src/p44/42 MAPK Pathway. J Biol Chem 275 (47): 37224-37231 (2000).
3. Tan J, Town T, Paris D, Mori T, Crawford F, Mattson M, Flavell R, Mullan M. The CD40-CD40L interaction leads to microglial activation after ?-amyloid stimulation. Science 286 (17): 2352-2355 (1999).

Honors/Awards

Ann C. DeBaldo, Ph.D.

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Global Health

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Came to USF: 1980

Contact Information:

Office: CPH 1005
E-Mail: adebaldo@hsc.usf.edu
Phone: (813) 974-6604
FAX: (813) 974-6616

Professor and Associate Dean

Discipline:

Global Public Health

Specialization:

Tropical Public Health
Immunology
Infectious Diseases

Degrees:

B.A., Microbiology, University of South Florida, 1975
Ph.D., Medical Science, University of South Florida, 1980
Certificate, Wellness Counseling & Mind-Body Consciousness, Institute of Transpersonal Psychology, Palo Alto, California, 1997

Dr. DeBaldo is a specialist in global tropical public health. Her research has been sponsored by the World Health Organization and the National Institutes of Health and has focused primarily upon the immunology of vector-borne and parasitic diseases including lymphatic filariasis. Field research projects and learning journeys conducted in the Caribbean and extensive travel throughout Southeast Asia and India, have emphasized public health and preventive aspects of parasitic and communicable disease in developing countries. A strong interest in cross-cultural dimensions of healthcare practices informs her work in global public health.

Department of Global Health • USF College of Public Health
13201 Bruce B. Downs Blvd., MDC 56 • Tampa, FL 33612
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USF UNIVERSITY OF SOUTH FLORIDA HEALTH SCIENCES CENTER



Stephen Klasko, MD, MBA

Vice President for Health Sciences Center
Dean, College of Medicine

I want to welcome you to a forum for discussion about the future of the Health Sciences Center at USF, and its respective colleges. This is a place to find presentations and projects of the HSC, and also to send me ideas by email.

I'm committed to designing the optimistic future for the Colleges of Medicine, Nursing and Public Health, as well as the School of Physical Therapy. We have great strengths in our faculty, our students, and our community's support, and we will build those strengths. This is a great university and I'm proud to be part of it.

Please post your ideas to the VP Forum, and I will assemble them and respond to issues here.

VP Forum

The VP Forum has been designed to address topics of interest to our faculty, staff, students, or visitors.

- Browse an archive of our previous VP Forums
- Add a topic of discussion to our VP Forum

Announcements

This section will introduce important items pertinent to our faculty, staff, students, and visitors. This section could be used to elicit feedback for the VP Forum.

HSC Mission Statement

The MISSION of the USF Health Sciences Center is to advance collaborative learning and discovery leading to improved health in our community

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Dr. Paul R. Sanberg, Director



OFFICE:
MDC 3150
PHONE:
974-3154
E-MAIL:
psanberg@hsc.usf.edu

>>Research
>>Publications

Research

Dr. Paul R. Sanberg is **Distinguished University Professor** and **Director** of the Center of Excellence for Aging and Brain Repair and **Associate Vice President/Associate Dean** for Biotechnology Development at the University Of South Florida College Of Medicine. Dr. Sanberg trained at York University, the University of British Columbia, the Australian National University and at the Johns Hopkins University School of Medicine. Dr. Sanberg has held academic positions at the Ohio University, the University of Cincinnati, and Brown University prior to his current position. He has also been on the Scientific Advisory Boards for Companies and Foundations. Dr. Sanberg is Editor-in-Chief of Cell Transplantation, Executive Director of the American Society for Neural Transplantation and Repair, and past president of the Cell Transplant Society, and others. He is the author of more than 400 scientific articles and has published thirteen books including, Neural Stem Cells: Methods and Protocols (Humana Press, 2002), and Neural Stem Cells for Brain and Spinal Cord Repair (Humana Press, 2003) and is an inventor on over twenty U.S. patents. His work is pioneering in understanding a role for stem cells in neurological disorders.

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Recent Publications

Newman, MB; Emerich, D; Borlongan, CV; Davis, CD; & Sanberg, PR: Use of human umbilical cord blood (HUCB) cells to repair the damaged brain. *Current Neurovascular Research*, 4(2): 269-281, 2004.

Borlongan, CV; Hadman, M; Davis, CD; & Sanberg, PR: CNS entry of peripherally injected umbilical cord blood cells is not required for neuroprotection in stroke. *Stroke*, 35:2385-2389, 2004.

Henning, RJ; Hamdi, AA; Balis, JU; Morgan, MB; Willing, AE; & Sanberg, PR:Human Umbilical cord blood mononuclear cells for the treatment of acute myocardial infarction. *Cell Transplantation, in press*, 2004.

Walczak, P; Chen, N; Hudson, JE; Willing, AE; Garbuzova-Davis, SN; Song, S;Sanberg, PR; Sanchez-Ramos, J; Bickford, PC; & Zigova, T: Do Hematopoietic cells exposed to a neurogenic environment mimic properties of endogenous neural

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Kay M. Perrin, Ph.D., M.P.H., R.N.

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Maternal & Child Health

Health Education

Came to USF: 1986

Assistant Professor

Contact Information:

Office:2131, MDC56

E-Mail: kperrin@hsc.usf.edu

Voice Mail: (813)974-6704

FAX: (813)974-5172

Discipline: Maternal & Child Health

Degrees:

B.A. University of California 1976
M.P.H. University of South Florida 1990
Ph.D. University of South Florida 1996

Specialization:

Maternal & Child Health
Program Planning and Evaluation
Spiritual Dimension of Health

Other Information:

Selected Publications
Research
Courses Taught
Curriculum Vitae
Biosketch

Since 1990, Kay Perrin has held faculty appointments at the University of South Florida College of Public Health in the Department of Community and Family Health, and currently is an Assistant Professor expected to go up for promotion and tenure next year. She is the Co-Principal Investigator for the department's Maternal-Child Health Leadership Training Grant, as well as the Co-PI on two major research grants. Until November 2002, she held the position of Secretary for ATMCH, is actively involved in at the local level with the Healthy Start Coalition, the Tampa Bay Area March of Dimes, and the Hillsborough County Network on Adolescent Pregnancy. Since 2000, she has served as P.I. for the Evaluation of Pinellas County Federal Healthy Start Project for $70,000, the National Evaluation of the March of Dimes Comenzando Bien Program for $110,000, and the Curriculum Development for the WAGES Coalition of Hillsborough County for $25,000. She has published papers on adolescent pregnancy and most recently was awarded a competitive university faculty grant to assess the Hillsborough County Teen Pregnancy Community Initiative. She currently serves as co-P.I. on two important research projects with budgets totaling close to $3 million. One

Socio-Health Sciences

Behavioral Health

of these, "Assessing the Range of Impacts of HPV-related Diagnoses," is a three-year study funded by the ASPH and Centers for Disease Control and Prevention. The other, "Evaluation of the Florida Health Literacy Study," is a two-year project funded by Pfizer, Inc., which investigates the implementation of low literacy English and Spanish patient education materials related to diabetes and hypertension in 28 community health centers across Florida. In addition, Dr. Perrin carries a full teaching and advising load in the department's Maternal and Child Health program. She regularly teaches two required courses for MPH students, Maternal and Child Health I and II and several support courses including Adolescent Health, Introduction to Research Methods, MCH Ethics and several web-based Internet undergraduate courses.

Department of Community and Family Health • USF College of Public Health • 13201 Bruce B. Downs Blvd., MDC 56 • Tampa, FL 33612
phone (813) 974-4867 • fax (813) 974-5172

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This page last updated July 21, 2004
Web Contacts

12901 Bruce B. Downs Blvd.
Tampa, Florida 33612
This page was last modified on 1/26/2005.

Cecile Lengacher, PhD, RN



Professor

College of Nursing

MDC 22

813-974-9147

clengach@hsc.usf.edu

EDUCATIONAL BACKGROUND

- BS (Nursing), 1964, University of Wisconsin-Madision, Madison, WI
- MS (Nursing), 1971, Marquette University, Milwaukee, WI
- PhD, 1983, Marquette University, Milwaukee, WI

CURRENT AND RECENT POSITIONS

- Tenured Professor, University of South Florida, College of Nursing, Tampa, FL (1996-present)
- Associate Professor and Assistant Dean for Undergraduate Studies, University of south Florida, Colle

RESEARCH INTERESTS

- Psychoneuroimmuniology and Breast Cancer, Complementary/alternative therapies
- Health Promotion, Role Strain, Women's Health, Role Socialization, Outcome research, and As
- Research on Instrument Development/Testing

RECENT PUBLICATIONS (SELECTED FROM 27 PEER_REVIEWED PUBLICATIONS)

- Allen, E., **Lengacher C.A.,** Beckstead J., & Gonzalez L. Religiousity, Depression and coping ir logic model. Resubmitted to *Nursing Oncology Forum*, March 2004.

- **Lengacher C. A.**, Bennett, M., Kip, Kevin, Keller, R, Gonzalez L., Jacobsen P., & Cox, E.. Reli Effects/Psychological Distress through Use of CAM in Women with Breast Cancer. Resubmitted 2004.

- Johnson-Mallard, V., **Lengacher, C.A.**, & Campbell, D.(in press). Development of a logic mod women of traditional childbearing age. Submitted to *The McKnight Journal*, August 2003

COURSES TAUGHT

- NGR 6121 - Theoretical Basis of Advanced Practice Nursing
- NGR 6971 - Thesis
- NGR 7123 - Theory Development
- NGR 7905 - Directed Readings
- NGR 7915 - Advanced Directed Research in Nursing



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1209 Lakeside Drive
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813.661.3662

Carol L. Roberts, M.D.

Carol L. Roberts, M.D. – Founder and Medical Director of Wellness Works located in Brandon, Florida. She graduated from Harvard University and the University Of Texas Medical School, specializing in Otolaryngology and Emergency Medicine. Dr. Roberts practiced Ear, Nose, and Throat (ENT) for ten years, followed by ten years of Emergency Medicine. During much of that time, she practiced and taught the principles of healthy living.

In 1994, she opened her private practice, Wellness Works, so that she could devote her career to the integration of conventional medicine with the natural and holistic techniques. Dr. Carol Roberts feels her function is to me a mentor, educator and a role model to her patients. Wellness Works provides nutritional counseling, natural hormone replacement therapy, chelation therapy, and anti-aging medicine. Nutritional therapies, oxidative therapies and classes in lifestyle change are offered, including Yoga and Tail Chi. Additionally, Wellness Works offers massage therapy, acupuncture, and chiropractic care.

With her extensive experience in both conventional and holistic medicine, Dr. Carol Roberts is a highly sought after national speaker. She also has a radio show in the Tampa area on WMNF 88.5 on alternate Mondays from1-2pm and is a regular contributor to area publications. Dr. Roberts has recently been appointed to the faculty of the School of Public Health at the University of South Florida and the Florida College of Integrative Medicine.

Beginning November 30, 2004 you can now listen to Dr. Roberts on WHNZ 1250am on Tuesday afternoons from 1-2pm.

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Clinical Trials

Clinical trials are medical research studies designed to answer specific questions about new therapies, procedures, or treatments, by testing them in people. This carefully conducted research helps to determine if the therapy is safe and effective.

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This page last modified May 25, 2005

NCCAM, National Institutes of Health
Bethesda, Maryland 20892 USA
Web: nccam.nih.gov
E-mail: info@nccam.nih.gov

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Randomized controlled trial of yoga and exercise in multiple sclerosis

B.S. Oken, MD; S. Kishiyama, MA; D. Zajdel; D. Bourdette, MD; J. Carlsen, AB; M. Haas, DC, MA; C. Hugos, MS, PT; D.F. Kraemer, PhD; J. Lawrence, BS; M. Mass, MD

Abstract—*Objective:* To determine the effect of yoga and of aerobic exercise on cognitive function, fatigue, mood, and quality of life in multiple sclerosis (MS). *Methods:* Subjects with clinically definite MS and Expanded Disability Status Score less than or equal to 6.0 were randomly assigned to one of three groups lasting 6 months: weekly Iyengar yoga class along with home practice, weekly exercise class using a stationary bicycle along with home exercise, or a waiting-list control group. Outcome assessments performed at baseline and at the end of the 6-month period included a battery of cognitive measures focused on attention, physiologic measures of alertness, Profile of Mood States, State-Trait Anxiety Inventory, Multi-Dimensional Fatigue Inventory (MFI), and Short Form (SF)-36 health-related quality of life. *Results:* Sixty-nine subjects were recruited and randomized. Twelve subjects did not finish the 6-month intervention. There were no adverse events related to the intervention. There were no effects from either of the active interventions on either of the primary outcome measures of attention or alertness. Both active interventions produced improvement in secondary measures of fatigue compared to the control group: Energy and Fatigue (Vitality) on the SF-36 and general fatigue on the MFI. There were no clear changes in mood related to yoga or exercise. *Conclusion:* Subjects with MS participating in either a 6-month yoga class or exercise class showed significant improvement in measures of fatigue compared to a waiting-list control group. There was no relative improvement of cognitive function in either of the intervention groups.

NEUROLOGY 2004;62:2058–2064

Mind-body medicine encompasses a range of methodologies, such as yoga, tai-chi, and meditation, that may be beneficial to the health of their practitioners. Yoga is a commonly practiced mind-body approach that has components centering around meditation, breathing, and postures. Of the active or Hatha yoga techniques, Iyengar yoga is probably the most common type practiced in the United States. A person assumes a series of stationary positions that utilize isometric contraction and relaxation of different muscle groups to create specific body alignments. There is also a relaxation component. Many people with multiple sclerosis (MS) have taken yoga classes and report high satisfaction. Of 1,980 survey respondents with MS in Oregon and southwest Washington, 30% indicated they had taken yoga classes; of those having taken yoga classes, 57% reported yoga as being "very beneficial."[1] This compared favorably to "very beneficial" ratings for therapeutic drugs: 37% of Avonex users, 26% of Betaseron users, 25% of Copaxone users, and 43% of IV corticosteroid users. Small pilot studies of other mind-body therapies in MS have suggested some benefit in physical measures and quality of life.[2,3]

Additional material related to this article can be found on the *Neurology* Web site. Go to www.neurology.org and scroll down the Table of Contents for the June 8 issue to find the title link for this article.

Physical activity by itself may be beneficial in MS. There have been several controlled trials of aerobic exercise in MS suggesting improvement in cardiovascular fitness.[4] There have also been reported improvements in quality of life, fatigue, and mood.[5,6] Thus, in designing this study we included an exercise intervention designed to accommodate and benefit a person with MS in addition to a wait-list control group to compare to the yoga intervention.

Besides quality of life, fatigue, and mood, there are a number of cognitive changes often associated in MS that may be impacted by yoga or physical activity. Deficits in attention, including speed of processing, are a common part of the cognitive disorder of MS.[7] Exercise or yoga may improve cognitive ability in MS by improving mood and reducing stress. Hatha yoga has been reported to produce improvements in mood comparable to aerobic exercise.[8,9] Additionally, yoga involves focusing one's attention on breathing or specific muscles or parts of body and it is unknown whether the attentional practice in yoga would generalize to conventionally assessed attentional function.

Despite yoga's wide popularity, there are few con-

From the Departments of Neurology (Drs. Oken, Bourdette, and Mass, and S. Kishiyama, D. Zajdel and C. Hugos), Behavioral Neuroscience (Dr. Oken), Rehabilitation (C. Hugos), and Medical Informatics and Clinical Epidemiology (Dr. Kraemer), Oregon Health & Science University, Portland; and Western States Chiropractic College (M. Haas), Portland, OR.

Portions of this article were presented at the 2003 American Academy of Neurology meeting.

Supported by P50 AT-00066 and Grant 5 M01 RR000334.

Received October 5, 2003. Accepted in final form February 11, 2004.

Address correspondence and reprint requests to Dr. Barry S. Oken, OR Health & Science University CR120, 3181 SW Sam Jackson Park Road, Portland, OR 97239; e-mail: oken@ohsu.edu

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trolled yoga studies in any neurologic disorder using objective quantitative outcome measures and these studies often have small numbers of subjects.[10-12] Further, despite the widespread advocacy and use of yoga in MS, there have been no controlled clinical trials. To help address this issue, we performed a randomized 26-week trial of yoga in MS in comparison to exercise and wait-list control groups.

Methods. *Study design.* This was a 6-month parallel-group, randomized controlled trial performed in adults with MS that had the approval of the OHSU Institutional Review Board. All subjects provided written informed consent. After completion of the baseline evaluations, subjects were randomized to one of the three experimental groups lasting 6 months: yoga class, exercise class, or wait-list control group. To ensure acceptance of the protocol, wait-list subjects were told they could enroll in either a yoga or exercise class after the 6-month period at no cost.

Subjects were randomly assigned to treatment groups in this study using a modified minimization scheme in such a way as to maintain balance across multiple stratification variables with relatively small numbers of subjects. Cohorts were recruited and then treatment group assignments were made for the entire cohort at one time. A cohort is a group of subjects enrolled within a 1-month period that allowed for active intervention subjects to begin their exercise and yoga classes at the same time. The stratification variables were age group (less than 50 years old and 50 years or older), sex, and baseline Expanded Disability Status Scale (EDSS) (less than or equal to 2.5 and greater than 2.5). Treatment assignment was made by the project statistician who was otherwise uninvolved with the assessments. Initially, all the subjects in each of the cohorts were randomly ordered ensuring this assignment scheme is, in fact, random. Then, the minimization approach of Taves[13] was used as a starting point. This process minimizes the absolute differences between the groups for each possible assignment of the next patient to treatment groups. Where these absolute differences are equal in two or three groups, the subject was assigned randomly (with probability of being assigned to one group equal across groups). The minimization approach was modified to account for randomization within cohorts prior to treatment assignment.

Subjects. Subjects were recruited through the local newspaper, the OHSU newsletter Web site, the newsletter of the local MS Society, and through the OHSU MS Center. Recruitment began January 1999 and the last cohort of subjects had outcome assessments in June 2002. A neurologist reviewed medical records for diagnostic criteria for MS.[14] In order to create a consistent exercise and yoga intervention, we enrolled only subjects with an EDSS of 6.0 or less, i.e., able to walk 100 meters with at most unilateral support.[15]

Prospective participants were screened for other major medical problems with medical history, physical examination, and EKG to ensure the safety of the intervention and to exclude subjects with an underlying medical illness that may impair cognition. We excluded subjects with: insulin-dependent diabetes; uncontrolled hypertension; liver or kidney failure; symptomatic lung disease; alcoholism/drug abuse; symptoms or signs of congestive heart failure, ischemic heart disease, or symptomatic valvular disease; or corrected visual acuity worse than 20/50 binocularly. Color vision was intact to color dot perception on the Stroop with 100% accuracy. We excluded subjects if they had performed yoga or tai-chi in the last 6 months or were regularly performing aerobic exercise more than 30 minutes per day. Subjects spoke English as their primary language.

Initially, as for many studies with cognitive outcome measures, we planned to not include subjects taking any medications known to affect CNS function or subjects with significant psychiatric diseases including major affective disorder. However, these exclusions were immediately eliminated since we were unable to recruit subjects with these exclusions. This recruitment problem was not dissimilar to the mentioned difficulties of a recent multicenter trial of donepezil in MS.[16] We simply encouraged subjects to minimize changes in CNS-active medications (e.g., modafinil and antidepressants) during the course of the study. For CNS-active medications taken on an as needed basis, subjects were asked to not take the medications within 24 hours of the assessments. The original targeted enrollment was 150 subjects with a projected power of 0.8 for the Stroop test. This was based on an estimated moderate effect size and a reasonably low dropout rate. However, it was decided to stop the enrollment at the halfway point, prior to any analysis, because these drug and psychiatric issues would add significant variance to the primary outcome measures even with, at best incomplete, statistical correction. To maintain adequate power for the primary outcome measures once these exclusions were removed would have required randomizing significantly more subjects than feasible with the budget.

Interventions. Yoga classes were 90 minutes in duration once per week. The yoga class was set up following discussions among certified Iyengar yoga teachers and a neurologist. The details of the design of the yoga class have been previously reported.[17] Briefly, the modifications to a usual Iyengar yoga class had to take into account fatigue as well as spasticity and cerebellar dysfunction. Essentially all poses were supported, either with a chair or having the subject on the floor or against the wall. Within that framework, 19 poses were instructed, although not all each week. The sequence of poses minimized exertion in getting up or down. Each pose was held for approximately 10 to 30 seconds with rest periods between poses lasting 30 seconds to 1 minute. Participants were encouraged to honor individual limits and hold the pose for less time if necessary. All poses were adapted to suit individual needs and modifications of some of the poses were taught for periods of lowered ability, e.g., during an exacerbation. There was an emphasis on breathing for concentration and relaxation during the session. Each class ended with a 10-minute deep relaxation with the subject lying supine. Progressive relaxation, visualization, and meditation techniques were introduced during this time. Daily home practice was strongly encouraged. Subjects were given a booklet demonstrating the specific poses practiced to assist in their home practice.

The aerobic exercise intervention arm was directed by a physical therapist with extensive experience with the MS population. The intervention was analogous to the yoga intervention with one class per week along with home exercise. The aerobic exercise consisted of bicycling on recumbent or dual-action stationary bicycles. The weekly exercise class began and ended with about 5 minutes of stretching of cycling muscles. Participants were instructed to stretch to a gentle pull but not to the point of pain and hold it for 15 to 30 seconds while breathing. Subjects monitored cycling intensity using the modified Borg Rate of Perceived Exertion scale.[18] Subjects were instructed to exercise at the 2 to 3 or very light to moderate intensity on the scale, i.e., they were able to converse during the sessions. There was no monitoring of heart rate. Although cycling was the usual mode of exercise, periodically participants were given the option of exercising on a Swiss ball. Occasional variety was provided by batting a balloon among participants while cycling and adding some arm, trunk, and balance work. Subjects continued bicycling until they were ready to stop because of fatigue, onset of other MS symptoms, or they reached their personal goal (e.g., 1 hour for several subjects). Subjects were given an exercise bicycle for home use if they did not already have one. Subjects were encouraged to exercise regularly at home (on bicycles and any other modes of exercise of choice) in addition to the weekly class session.

Compliance with the interventions was assessed by study participants daily filling out 2-week log sheets that recorded whether they exercised or practiced yoga and for how long. Class attendance was also recorded.

Assessments. After screening medical history, physical examination, and routine EKG, baseline assessments of outcome measures were performed. Baseline assessments were performed before subjects were randomized and occurred 1 to 30 days before the classes started. The practical limitations on the rate of testing participants necessitated three separate cohorts of subjects. Each cohort contained 23 subjects, each of whom was allocated to one of the three intervention arms. Outcome assessments were done at baseline and 6 months. There was also a 3-month visit although not all outcome measures were obtained at this mid-study visit and these data were not included in the analysis. On the baseline visit, demographic data were recorded and the oral reading on the Wide Range Achievement Test (WRAT) 3rd edition[19] was administered to assess equality of educational achievement in the three intervention groups.

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It was important to plan carefully to maintain blinding of the assessors generating the outcome measures, since the subjects were non-blinded. Only a single liaison person who was responsible for direct phone calls to subjects was unblinded, and this person did not participate in one on one testing after randomization, i.e., after the baseline assessment. The 3- and 6-month assessments were planned carefully to ensure continued blinding. Some of the outcome measures were done independently of any assessor (self-rating forms). For the in-person evaluations, the liaison person scheduling the appointment instructed the subjects to not tell the assessor what intervention group they were in. A reminder call the day prior to the assessment was made and subjects reminded to not speak about their intervention group. Even with these precautions there were rare instances of unblinding. However, the assessments were objective and many were computer based and scored. The blinded research staff maintained equipoise about potential results of the study. The data analysis was blinded to intervention group.

No assessments were performed within 50 days of an exacerbation, defined as new, recurrent, or worsening neurologic symptoms present for more than 24 hours, documented by neurologic examination and not associated with a febrile illness. Subjects with MS with a recent exacerbation were retested as soon as they were more than 50 days post exacerbation onset. During this time, they continued the intervention to which they were initially randomized to whatever degree they could.

The baseline and outcome sets of cognitive assessments were performed at the same time of day for each subject, at their preferred time either in the morning or afternoon. The subjects were instructed to refrain from alcohol consumption for 24 hours prior to the testing. They were allowed to ingest their usual dose of morning caffeine.

Cognitive measures. The cognitive assessments focused on aspects of attention (focusing attention, shifting attention, dividing attention, and sustaining attention) that may be impaired in subjects with MS and were also thought to be most likely to be improved with the intervention. The Stroop Color and Word Test[20] color-word interference was used as a measure of ability to focus attention. The covert orienting of spatial attention task compares reaction time (RT) when targets are validly cued, neutrally cued, invalidly cued, or not cued.[21-23] Median RTs were calculated for the four cue conditions and the change in RT to validly cued circles from the beginning to last quartile was used as a measure of mental fatigue or vigilance. The attentional shifting task utilized was adapted from that used in the Cambridge Neuropsychological Test Automated Battery and is related to the Wisconsin Card Sorting Test. It allows attentional shifting to be broken down into three types: intradimensional, reversal, and extradimensional.[24] The outcome measure was the percentage of error trials and numbers of shifts correctly performed prior to completion. A modified Useful Field of View task was chosen as a divided attention test since it has been used in MS and has ecologic validity in relationship to driving ability[25,26] and has been previously shown to be changed in people with MS.[27] Our modification determined a precise temporal threshold. Simple visual RT was measured at the beginning and end of the test session. The difference in median RT between the end and beginning of the session was used as a measure of vigilance or mental fatigue. The Paced Auditory Serial Addition Test (PASAT) was also administered.[28,29] In case there were effects of the intervention on alertness and attention, we performed other cognitive tasks to determine the specificity of the effect: the Wechsler Memory Scales III Logical Memory[30] (delayed memory adjusted for immediate recall) and the Wechsler Adult Intelligence Scale III Similarities.[31]

Alertness, mood, fatigue, and quality of life. Alertness was measured with two subjective scales, the Stanford Sleepiness Scale (SSS)[32] and the Profile of Mood States (POMS)[33] subscales, and an objective measure based on EEG frequency analysis as we have previously done.[23] The only EEG frequency analysis measures used for this analysis were posterior median power frequency and relative alpha activity recorded from the eyes closed rest and eyes closed attentive state. We have previously shown these alertness measures to be sensitive to drug effects.[23,34] The SSS was administered at the beginning and end of the cognitive testing sessions. Subjects took the POMS once at the end of the session. We used the POMS mood subscales as well since it has been reported to show improvement with an exercise intervention in MS study[5] and with a Hatha yoga intervention in young adults.[8]

Mood, including measures of fatigue and vigor, was assessed using the POMS.[33] Fatigue was also assessed using the Multidimensional Fatigue Inventory (MFI).[35] Depression was assessed by the POMS and the CESD-10.[36] Stress was assessed using the State Trait Anxiety Inventory (STAI).[37] Health-related quality of life was assessed by the Short Form (SF)-36.[38] The MFI, POMS, STAI, and SF-36 were filled out by the subjects at home and reviewed by the research assistant at the time of the cognitive testing to help minimize the duration of the assessment session.

Physical measures. As part of the standard MSFC, 25-foot timed walk and the 9-Hole Peg Test were performed. Subjects performed a measure of forward bend flexibility: the chair sit and reach.[39] Subjects were asked to stand as long as they could on one leg with and without their eyes open. Data from subjects requiring an aid to stand were eliminated from this particular outcome analysis.

Data analysis. The analysis used all randomized subjects who completed the 6-month study and no attempt was made to impute missing variables.

Comparisons of the baseline factors age, MSFC, and EDSS among the three intervention groups were done using an analysis of variance. The outcome data were analyzed using an analysis of covariance (ANCOVA) approach with baseline value as the covariate, indicator variables for each of the two active groups (i.e., yoga and exercise), and the interactions of the indicators with baseline. In addition, three baseline factors (age, EDSS, and sex) were evaluated as potential confounding variables. The numeric values of age and of EDSS were included in these models rather than grouping the numeric values into categories.

The following approach was used to determine the "best" ANCOVA model for each response. Backward variable elimination determined which among baseline, age, EDSS, and an indicator for age were significant predictors. Any predictor significant at 0.10 was included in the next stage of model fitting. Second, indicator variables for the two active groups and the interactions of these indicators with baseline were added to the best model above. Partial F-tests were used to test whether the two interaction terms were simultaneously equal to zero. If the interactions were not significant, partial F-tests were also used to simultaneously test whether the two group indicators were simultaneously equal to zero. If either hypothesis was rejected, backward elimination was used to eliminate any individual terms that were not significant (using a significance level of 0.05). Residuals from the best model were assessed to determine if normality was violated (in particular if there was substantial skewness). If so, one or more transformations (the natural logarithm, square root, or the rank transformation, in order) were evaluated by following this same approach.

The primary outcome measures were assessment of alertness based on EEG median power frequency and color-word interference on the Stroop Color and Word Test.[20] No Bonferroni adjustments were made for multiple outcome measures. The secondary measures were the rest of the cognitive assessments, self-rated scales (MFI, POMS, CESD-10, SF-36), and the physical measures.

Results. Following phone screening of 129 subjects, 69 eligible subjects gave informed consent and were randomized to one of three groups (figure). Forty potentially eligible subjects declined the study for various reasons including practical issues (could not attend a weekly class, too far a drive to the class site), not wanting to accept randomization (e.g., wanted to start a yoga class and would not accept randomization to a wait-list group), and religious reasons (one subject believed that the yoga class conflicted with religious beliefs). Characteristics of the enrolled subjects are shown in table 1. There were no significant differences in age, baseline EDSS, MSFC, or WRAT among the three groups (p values all greater than 0.1). Twelve subjects did not complete the 6-month intervention and the dropout rate was not significantly different across the groups as assessed by Pearson chi-square ($p = 0.23$). The 17% dropout rate was not related to adverse events

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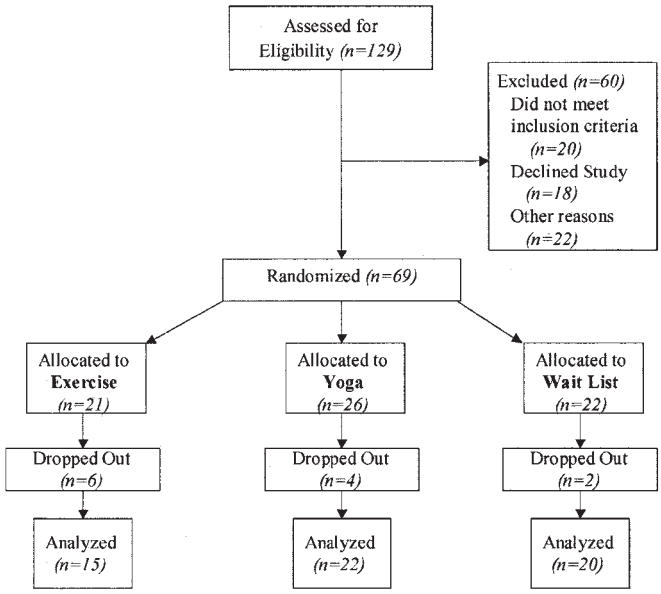


Figure. Numbers of subjects screened, enrolled in study, randomized, dropped out, and analyzed.

since there were no adverse events related to the intervention. There were six adverse events reported: three for unrelated surgeries; two MS exacerbations, one in the yoga and one in the exercise group; and one low back pain related to an auto accident. The most common cause for dropping out of the study was the inability to attend classes for various reasons (family health issues, time constraints, too far to get to class, and new personal health issues not related to the intervention). There were several dropouts related to dissatisfaction with the randomization group (wait-list and exercise) despite the subjects having been given a clear explanation of the randomization process and the subjects having to specifically verbally consent to accept the random assignment in addition to signing the consent form that contained this information as well.

Of the subjects who completed the 6-month exercise intervention arm, attendance rate at the weekly classes was 65%. Home exercise occurred on an average of 45% of the days other than the class day and lasted an average of 32 minutes (range 15 to 57 minutes). For the group completing the 6-month yoga intervention, attendance rate was 68%; home practice occurred on 51% of the non-class days and averaged 39 minutes (range 14 to 80). None of these active group differences were significant.

There was no effect of assignment group on any of the cognitive function or alertness measures, which included the primary outcome measures for this study (table 2 and supplementary data, available at www.neurology.org).

The active intervention groups were significantly better than the wait-list control group on several self-rated measures. The SF-36 quality of life measure demonstrated an assignment group effect on Vitality ($p < 0.001$), which has been also named Energy and Fatigue[40] (see table 2 and supplementary data, available at www.neurology.org). Both treatment groups demonstrated similar improvements compared to the wait-list control group. The Health Transitions subscore on the SF-36 was slightly different in the yoga group ($p < 0.01$) but there was an interaction with baseline score such that only people who self-rated themselves at baseline worse than they were a year ago may have improved. On the MFI there was an effect on general fatigue with either intervention ($p < 0.01$) but no clear effect on the other domains of the MFI (see table 2). The POMS subscales including Fatigue and Depression, the CESD-10, and the State Trait Anxiety measure demonstrated no significant changes from the interventions (see supplementary data, available at www.neurology.org).

Several measures that were included because they were thought to be potentially sensitive to the physical aspects of the intervention (chair sit and reach and one-legged standing) did not demonstrate any significant changes from the interventions.

Baseline SF-36 Energy and Fatigue and MFI General Fatigue were not correlated with EDSS, and there was only a borderline significant correlation between SF-36 Energy and Fatigue and MSFC (see supplementary data, available at www.neurology.org). There were more significant correlations between these two fatigue measures and the two depression measures, the CESD-10 and POMS Depression subscore. However, the improvements in fatigue based on the changes in the SF-36 Energy and Fatigue score and MFI General Fatigue score were not correlated to baseline CESD-10 or EDSS scores and covarying for CESD-10 scores produced no significant change in the effect of the interventions on the fatigue measures.

Discussion. This is the first randomized controlled trial of yoga in MS. The trial demonstrated that a 6-month yoga program improved fatigue to the same degree as a traditional exercise program and was adhered to at a level comparable to that of a traditional exercise program. More specifically, the interventions produced improvements in fatigue as assessed by the MFI (General Fatigue) and the SF-36 Energy and Fatigue (Vitality) dimension of the SF-36. The yoga and aerobic exercise program produced no significant changes compared with the

Table 1 *Subject demographics by group for all subjects whose baseline and 6-month data were available*

Groups	Total	Women	Men	Age, y	EDSS	MSFC	WRAT-R
Exercise	15	13	2	48.8 ± 10.4	2.9 ± 1.7	0.18 ± 0.6	50.5 ± 3.1
Yoga	22	20	2	49.8 ± 7.4	3.2 ± 1.7	0.13 ± 0.8	49.0 ± 4.3
Waiting list	20	20	0	48.4 ± 9.8	3.1 ± 2.1	0.04 ± 0.7	48.7 ± 6.4

Means ± SD are shown. The EDSS range was 1.5–6.0 in all groups.

EDSS = Expanded Disability Status Scale; MSFC = Multiple Sclerosis Functional Composite; WRAT = Wide Range Achievement Test.

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Table 2 *Baseline and 6-month outcomes data on all subjects for whom both data points were available*

Outcome measures	Time point	Exercise	Yoga	Wait list
Stroop Color-Word Interference	Baseline	10.1 ± 3.7	10.8 ± 6.0	11.0 ± 7.1
	End of study	9.9 ± 6.2	8.5 ± 4.5	8.1 ± 4.4
EEG Median Power Frequency	Baseline	9.7 ± 1.1	9.7 ± 0.8	9.7 ± 0.9
	End of study	9.2 ± 1.2	9.2 ± 1.1	9.4 ± 1.1
SF-36 Health Survey				
Physical Functioning	Baseline	62.0 ± 25.9	58.6 ± 31.6	58.1 ± 19.0
	End of study	60.0 ± 27.9	61.0 ± 31.6	58.1 ± 23.3
Physical Health Impact	Baseline	76.7 ± 25.8	50.0 ± 44.0	40.3 ± 37.5
	End of study	61.7 ± 41.0	48.8 ± 39.1	52.8 ± 43.6
Bodily Pain	Baseline	55.1 ± 13.3	71.0 ± 19.8	65.1 ± 26.0
	End of study	70.8 ± 17.4	69.6 ± 17.3	68.9 ± 25.3
General Health	Baseline	62.7 ± 15.6	60.7 ± 24.8	49.9 ± 19.1
	End of study	61.0 ± 16.0	60.3 ± 18.4	55.4 ± 16.5
Energy and Fatigue	Baseline	45.7 ± 22.7	43.1 ± 17.7	39.7 ± 18.1
	End of study	52.8 ± 18.8*	51.2 ± 16.7*	36.7 ± 18.1
Social Functioning	Baseline	83.3 ± 16.8	72.0 ± 24.0	66.0 ± 27.1
	End of study	81.7 ± 24.0	64.9 ± 17.9	70.8 ± 23.5
Emotional Health Impact	Baseline	82.2 ± 27.8	72.4 ± 32.4	72.2 ± 43.2
	End of study	88.9 ± 30.0	87.3 ± 24.7	72.2 ± 36.6
Mental Health	Baseline	79.2 ± 16.4	73.7 ± 12.9	75.6 ± 18.8
	End of study	83.7 ± 10.5†	73.5 ± 14.3	75.6 ± 14.3
Health Transition	Baseline	43.3 ± 22.1	42.9 ± 25.2	58.3 ± 22.7
	End of study	36.7 ± 28.1	35.7 ± 20.8*	48.6 ± 20.1
MFI				
General Fatigue	Baseline	13.2 ± 4.0	14.7 ± 3.3	15.1 ± 3.4
	End of study	12.1 ± 2.8‡	13.0 ± 2.9‡	14.9 ± 3.0
Physical Fatigue	Baseline	13.2 ± 4.6	13.9 ± 3.5	14.4 ± 4.0
	End of study	10.8 ± 4.0	12.1 ± 4.4	13.9 ± 4.5
Reduced Activity	Baseline	10.5 ± 3.8	12.2 ± 4.7	12.9 ± 4.2
	End of study	9.9 ± 3.9	11.2 ± 4.1	11.5 ± 4.5
Reduced Motivation	Baseline	7.9 ± 2.7	10.1 ± 3.4	10.4 ± 3.2
	End of study	7.7 ± 3.4	9.2 ± 3.0	9.8 ± 3.0
Mental Fatigue	Baseline	8.3 ± 4.8	11.4 ± 4.7	11.7 ± 3.5
	End of study	7.8 ± 4.4	10.7 ± 4.0	11.2 ± 3.9

* $p < 0.001$.
† $p < 0.05$.
‡ $p < 0.01$.

Results are for the primary outcome measures, MFI and SF-36. Additional data on other outcome measures are available as supplemental data on the *Neurology* Web site.

SF-36 = Short Form-36; MFI = Multidimensional Fatigue Inventory.

wait-list control group on the primary outcome measures of alertness and attention, or on other secondary measures of cognitive function. While there are claims that yoga may affect the underlying disease process in MS, this 6-month intervention study was not designed to determine whether there would be any impact on the underlying disease.

Fatigue is a common and potentially disabling symptom in MS.[41-43] Some aspect of fatigue in MS relates to depression as we found in our study and others have found, but there are aspects of fatigue in MS that are not clearly related to depression.[41,44,45] In addition to our observation, others have also observed that the fatigue symptom in MS is relatively independent of disease severity as assessed by EDSS or MRI.[41,44,46] However, fatigue still contributes to

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impairments in health-related quality of life.[47,48] The improvement in fatigue from the interventions in this study was partially independent of depression since there was not as significant an effect of the intervention on the depression measures as on fatigue. Also, the improvement in fatigue was not related to baseline levels of depression.

It is important to at least distinguish between physical and mental fatigue which some scales such as the Fatigue Severity Scale[49] do not. There are other fatigue scales that distinguish physical and mental fatigue.[45,50] We chose to use the MFI because it has been used in a number of neurologic disorders[51,52] and has these two distinct fatigue subscales. The fact that MFI General Fatigue subscale was more significantly improved than other MFI subscales and that the Energy and Fatigue subscale on the SF-36 was the most significant suggests that the improvement is not in the realm of mental fatigue. This is further supported by the absence of any effects of the interventions on mentally fatiguing tasks and vigilance measures. Also, this observation is consistent with a prior study in MS that concluded mental fatigue did not correlate with the overall sense of fatigue as captured on the Fatigue Severity Scale.[53] However, it is possible that improvement in physical function is contributing to the observed improvements in fatigue given the types of questions on the MFI General Fatigue and SF-36 Energy and Fatigue subscales as well as the tendency to greater changes in MFI Physical than Mental subscales.

Most prior research on exercise in MS has focused on physiologic measurements (see review[4]). One study attained a 97% supervised exercise class attendance rate[5] but it seems unlikely that attendance rate would be sustainable for MS subjects outside a research study. That study observed improvements in the POMS on depression and anger at weeks 5 and 10 but not at week 15. They noted no change in the Fatigue Severity Scale throughout the study but did find improvements on POMS fatigue at week 10 only and thought this difference may be related to the Fatigue Severity Scale's lack of sensitivity to changes over time. Another study randomized 26 subjects with MS to either a stationary bicycle exercise program with five 30-minute supervised training sessions per week over 3 to 4 weeks or a no-intervention control group.[6] The exercise group did better than their baseline in Vitality and Social Interaction on the SF-36, as well as a trend toward improvement on fatigue as assessed on the Fatigue Severity Scale with no change in these measures noted in the control group.

While we showed that both interventions produced beneficial effects on measures of fatigue, the mechanism of action of these improvements is unclear and may not relate directly to the yoga or exercise. Socialization, placebo, and self-efficacy effects are other potential mechanisms. Both interventions had an element of socialization that, by itself, may have contributed to some benefits. Prior investigators have also commented on the lack of an adequate social control group for their exercise intervention study.[5] There is likely some placebo effect related to the interventions. One group has already shown that psychological benefits of an aerobic exercise intervention in a group of healthy young adults could be increased simply by telling subjects that the exercise program was specifically designed to improve psychological well-being.[54] The issues of placebo effect and self-efficacy, both of which may have a significant impact,[55,56] are difficult to adequately control for in behavioral interventions that are necessarily non-blinded.

Although there were many secondary outcome measures, we do not believe the findings are simply random results from multiple comparisons. The p value for the intervention effect on the SF-36 Energy and Fatigue measure was sufficiently low that it would have been significant even with a very conservative Bonferroni adjustment. The fact that the Energy and Fatigue measure on the SF-36 and the General Fatigue measure on the MFI showed similar results also represents independent confirmation of the finding. Given the decision to end the study after 69 subjects were enrolled, the study is underpowered for medium effect sizes, approximately only 0.50 power in the ANCOVA for medium effect sizes ($F = 0.25$). The 20 subjects per group powers the study to 0.80 only for a moderate to large effect size ($F = 0.35$), e.g., a 3.5 point difference on the CESD-10. Thus, the absence of statistically significant effects on the mood and cognitive measures needs to be interpreted cautiously and is still open to investigation. There is a possibility that mood improvements contributed to these improvements in quality of life and fatigue.

The yoga and exercise classes were significantly modified from the usual community classes to take into account some of the limitations subjects with MS may have. Thus, the results of this study many not be directly generalizable to a typical community yoga or exercise class. The other potential issue related to generalizability is that our subjects were almost all women but we do not believe the results of this study would not generalize to men.

Acknowledgment

The authors thank Roger Ellingson for computer programming support, Kaleeswari Arulselvam and Magda Rittenbaum who performed EDSS evaluations and assisted in testing, Eric Small, a certified Iyengar instructor, who helped with the design of the yoga class for people with MS, photographer John Estrem who generated the yoga pose pictures that were given in a booklet to subjects in the yoga intervention group, and the Multiple Sclerosis Center of Oregon for assisting with subject recruitment.

References

1. Bourdette D, Yadav V, Shinto L. Multiple sclerosis. In: Oken BS, ed. Complementary therapies in neurology: an evidence-based approach. New York: Parthenon Publishing, 2004;291–302.
2. Husted C, Pham L, Hekking A, Niederman R. Improving quality of life for people with chronic conditions: the example of t'ai chi and multiple sclerosis. Altern Ther Health Med 1999;5:70–74.

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3. Mills N, Allen J. Mindfulness of movement as a coping strategy in multiple sclerosis. A pilot study. Gen Hosp Psychiatry 2000;22:425–431.
4. Sutherland G, Andersen MB. Exercise and multiple sclerosis: physiological, psychological, and quality of life issues. J Sports Med Phys Fitness 2001;41:421–432.
5. Petajan JH, Gappmaier E, White AT, Spencer MK, Mino L, Hicks RW. Impact of aerobic training on fitness and quality of life in multiple sclerosis. Ann Neurol 1996;39:432–441.
6. Mostert S, Kesselring J. Effects of a short-term exercise training program on aerobic fitness, fatigue, health perception and activity level of subjects with multiple sclerosis. Mult Scler 2002;8:161–168.
7. Bobholz JA, Rao SM. Cognitive dysfunction in multiple sclerosis: a review of recent developments. Curr Opin Neurol 2003;16:283–288.
8. Berger BG, Owen DR. Mood alteration with yoga and swimming: aerobic exercise may not be necessary. Percept Motor Skills 1992;75(3 Pt 2):1331–1343.
9. Berger B, Owen D. Stress reduction and mood enhancement in four exercise modes: swimming, body conditioning, Hatha yoga, and fencing. Res Q Exerc Sport 1988;59:148–159.
10. Garfinkel M, Singhal A, Katz W, Allan D, Reshetar R, Schumacher HJ. Yoga-based intervention for carpal tunnel syndrome. JAMA 1998;280:1601–1603.
11. Ramaratnam S, Sridharan K. Yoga for epilepsy. Cochrane Database of Systematic Reviews 2002.
12. Riley D. Hatha yoga and meditation. In: Oken BS, ed. Complementary therapies in neurology: an evidence-based approach. New York: Parthenon Publishing, 2004;159–167.
13. Taves DR. Minimization: a new method of assigning patients to treatment and control groups. Clin Pharmacol Ther 1974;15:443–453.
14. McDonald W, Compston A, Edan G, et al. Recommended diagnostic criteria for multiple sclerosis: guidelines from the international panel on the diagnosis of multiple sclerosis. Arch Neurol 2001;50:121–127.
15. Kurtzke J. Rating neurological impairment in multiple sclerosis: an expanded disability status scale (EDSS). Neurology 1983;33:1444–1452.
16. Krupp LB, Christodoulou C, Melville P, Elkins LE, Hussein M. Interventions to improve memory in MS: the Aricept in MS study (AIMS): 24 week data. Neurology 2003;60:A477.
17. Kishiyama S, Carlsen J, Lawrence J, Small E, Zajdel D, Oken B. Yoga as an experimental intervention for cognition in multiple sclerosis. International Journal of Yoga Therapy 2002;12:57–62.
18. Borg GAV. Psychophysical bases of perceived exertion. Med Sci Sports Exerc 1982;14:377–381.
19. Wilkinson GS. Wide Range Achievement Test 3. Wilmington: Wide Range, Inc., 1993.
20. Perret E. The left frontal lobe of man and the suppression of habitual responses in verbal categorical behavior. Neuropsychologia 1974;12:323–330.
21. Posner MI. Orienting of attention. Q J Exp Psychol 1980;32:3–25.
22. Oken BS, Kishiyama SS, Kaye JA, Howieson DB. Attention deficit in Alzheimer's disease is not simulated by an anticholinergic/anithistaminergic drug and is distinct from deficits in healthy aging. Neurology 1994;44:657–662.
23. Griesar WS, Zajdel DP, Oken BS. Nicotine effects on alertness and spatial attention in non-smokers. Nicotine and Tobacco Research 2002;4:185–194.
24. Dias R, Robbins T, Roberts A. Dissociation in prefrontal cortex of affective and attentional shifts. Nature 1996;380:69–72.
25. Ball KK, Roenker DL. UFOV: useful field of view. San Antonio: The Psychological Corporation, Harcourt Brace & Company, 1998.
26. Ball K, Owsley C, Sloane ME, Roenker DL, Bruni JR. Visual attention problems as a predictor of vehicle crashes in older drivers. Invest Ophthalmol Vis Sci 1993;34:3110–3123.
27. Shawaryn MA, Schultheis MT, Garay E, Deluca J. Assessing functional status: exploring the relationship between the multiple sclerosis functional composite and driving. Arch Phys Med Rehabil 2002;83:1123–1129.
28. Gronwall DMA. Paced auditory serial-addition task: a measure of recovery from concussion. Percept Mot Skills 1977;44:367–373.
29. Fischer JS, Rudick RA, Cutter GR, Reingold SC. The Multiple Sclerosis Functional Composite Measure (MSFC): an integrated approach to MS clinical outcome assessment. Mult Scler 1999;5:244–250.
30. Wechsler D. Wechsler Memory Scale—third edition. San Antonio, TX: The Psychological Corporation, 1997.
31. Wechsler D. Wechsler Adult Intelligence Scale—third edition. San Antonio, TX: The Psychological Corporation, 1997.
32. Hoddes E, Zarcone V, Smythe H, Phillips R, Dement WC. Quantification of sleepiness: a new approach. Psychophysiology 1973;10:431–436.
33. McNair DM, Lorr M, Droppleman LF. Manual for the Profile of Mood States. San Diego: EdITS/Educational and Industrial Testing Service, 1992.
34. Oken BS, Kishiyama SS, Salinsky MC. Pharmacologically induced changes in arousal: effects of methylphenidate and diphenhydramine on behavioral and electrophysiologic measures of alertness and attention. EEG Clin Neurophysiol 1995;95:359–371.
35. Smets EM, Garssen B, Bonke B, De Haes JC. The Multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. J Psychosom Res 1995;39:315–325.
36. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). Am J Prev Med 1994;10:77–84.
37. Spielberger C, Gorsuch R, Lushene R. The state trait anxiety inventory (STAI) test manual. Palo Alto, CA: Consulting Psychologists Press, 1983.
38. Ware JF. SF-36 Health Survey: manual interpretation guide. Boston: The Health Institute, 1993.
39. Hui SS, Yuen PK. Validity of the modified back-saver sit-and-reach test: a comparison with other protocols. Med Sci Sports Exerc 2000;32:1655–1659.
40. Hays J, Ockene JK, Brunner RL, et al. Effects of estrogen plus progestin on health-related quality of life. N Engl J Med 2003;348:1839–1854.
41. Krupp LB, Alvarez LA, LaRocca NG, Scheinberg LC. Fatigue in multiple sclerosis. Arch Neurol 1988;45:435–437.
42. Freal JE, Kraft GH, Coryell JK. Symptomatic fatigue in multiple sclerosis. Arch Phys Med Rehabil 1984;65:135–138.
43. Branas P, Jordan R, Fry-Smith A, et al. Treatments for fatigue in multiple sclerosis: a rapid and systematic review. Health Technol Assess 2000;4:27.
44. Bakshi R, Shaikh ZA, Miletich RS, et al. Fatigue in multiple sclerosis and its relationship to depression and neurologic disability. Mult Scler 2000;6:181–185.
45. Ford H, Trigwell P, Johnson M. The nature of fatigue in multiple sclerosis. J Psychosom Res 1998;45:33–38.
46. van der Werf SP, Jongen PJ, Lycklama á Nijeholt GJ, Barkhof F, Hommes OR, Bleijenberg G. Fatigue in multiple sclerosis: interrelations between fatigue complaints, cerebral MRI abnormalities and neurological disability. J Neurol Sci 1998;160:164–170.
47. Merkelbach S, Sittinger H, Koenig J. Is there a differential impact of fatigue and physical disability on quality of life in multiple sclerosis? J Nerv Ment Dis 2002;190:388–393.
48. Fisk JD, Pontrefact A, Ritvo PG, Archibold CJ, Murray TJ. The impact of fatigue on patients with multiple sclerosis. Can J Neurol Sci 1994;21:9–14.
49. Krupp L, LaRocca N, Muir-Nash J, Steinberg A. The fatigue severity scale applied to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol 1989;46:1121–1123.
50. Chalder T, Berelowitz G, Pawlikowska T, et al. Development of a fatigue scale. J Psychosom Res 1993;37:147–153.
51. Lou JS, Kearns G, Oken B, Sexton G, Nutt J. Exacerbated physical fatigue and mental fatigue in Parkinson's disease. Mov Disord 2001;16:190–196.
52. Lou JS, Reeves A, Benice T, Sexton G. Fatigue and depression are associated with poor quality of life in ALS. Neurology 2003;60:122–123.
53. Krupp LB, Elkins LE. Fatigue and declines in cognitive functioning in multiple sclerosis. Neurology 2000;55:934–939.
54. Desharnais R, Jobin J, Cote C, Levesque L, Godin G. Aerobic exercise and the placebo effect: a controlled study. Psychosom Med 1993;55:149–154.
55. Oken BS. Placebo effect: clinical perspectives and potential mechanisms. In: Oken BS, ed. Complementary therapies in neurology: an evidence-based approach. New York: Parthenon Publishing, 2004;199–230.
56. Crow R, Gage H, Hampson S, Hart J, Kimber A, Thomas H. The role of expectancies in the placebo effect and their use in the delivery of health care: a systematic review. Health Technol Assess 1999;3:1–48.

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