

**Harvard Medical School** 



# Yoga Research: Past, Present and Future

October 8, 2015

Kripalu 24th Annual Yoga Teachers Conference Kripalu Center for Yoga & Health

## Sat Bir S. Khalsa, Ph.D.

Assistant Professor of Medicine, Harvard Medical School Director of Research, Kundalini Research Institute Research Director, Kripalu Center for Yoga and Health Editor in Chief, International Journal of Yoga Therapy Research Associate, Benson Henry Institute for Mind Body Medicine

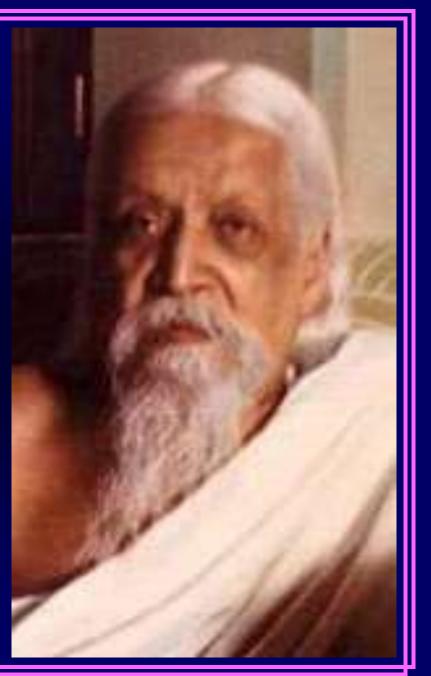






"...a methodised effort towards self-perfection by the expression of the secret potentialities latent in the being ... a union of the human individual with the universal and transcendent Existence..."

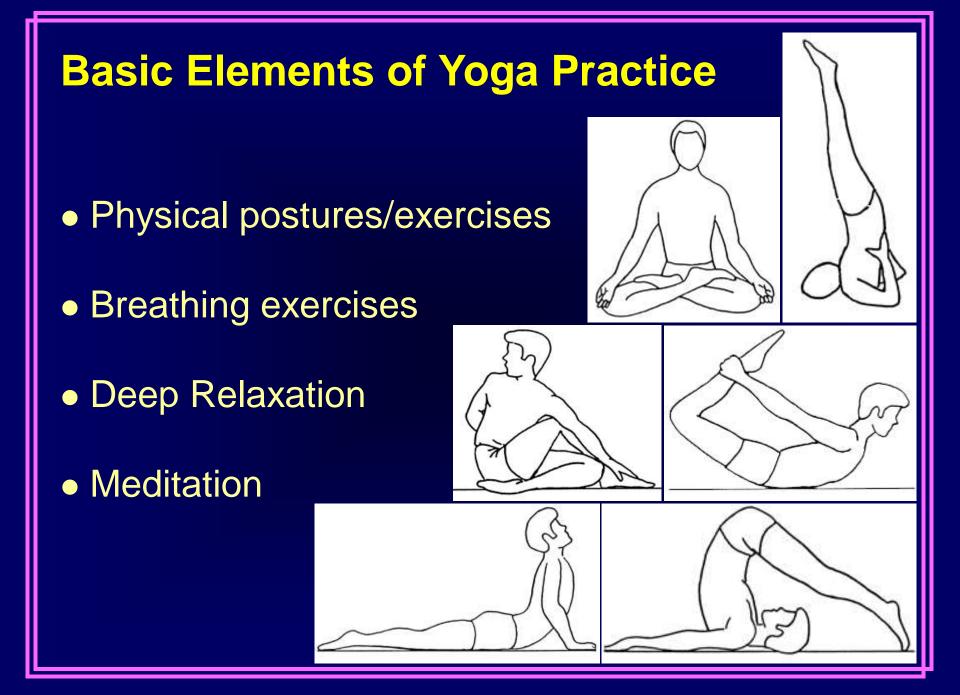
Sri Aurobindo



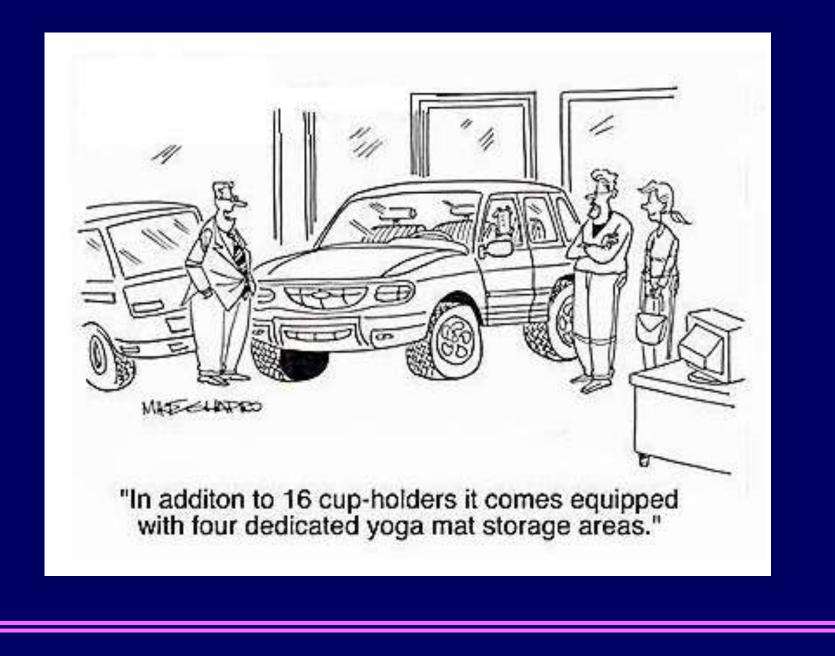


"Yoga teaches you the techniques and awareness to stay healthy. You gain strong immune, glandular and nervous systems. This foundation gives you energy and lets you deal with the mental and spiritual facets of your life."

Yogi Bhajan

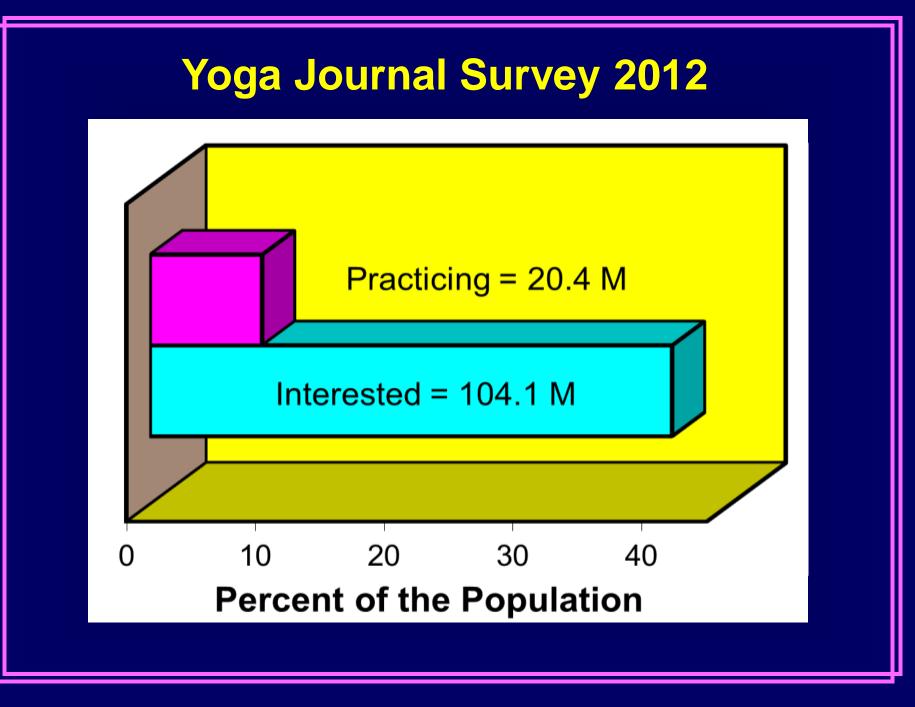


# Prevalence of Yoga Practice



# **Popularity of Yoga Practice**





#### 10 Most Common CAM Therapies Among Adults - 2007 20 17.7% **Deep Breathing Meditation** 15 Yoga Progressive 12.7% Relaxation 9.4% Therapies with significant increases 8.6% 10 8.3% between 2002 and 2007 are 2002 6.1% **Deep breathing** 11.6% 12.7% Meditation 7.6% 3.6% 5 2.9% Massage 5.0% 2.2% 5.1% Yoga 1.8% Chiropactic Bathic Progressive tion Diet Based ies Homeopathic Deep Breathing Natural Products Guided Imagery Meditation Massage 4093

2007

9.4%

8.3%

6.1%

From: Complementary and Alternative Medicine Use Among Adults and Children: United States, 2007, Barnes PM, Bloom B, Nahin R. CDC National Health Statistics Report #12, 2008.

# Yoga Practice U.S. Adult Population

Tai chi Qi gong 12 10 Age-adjusted percent 8 6 39.5 4 26.1 15.1 2 0.3 0.3 0.3 0 2002 2007 2012 Survey year I 95% confidence interval Significantly different from 2007 and 2012 (p < 0.05). <sup>2</sup>Significantly different from 2012 (p < 0.05). 3Significantly different from 2002 and 2007 (p < 0.05). NOTES: Estimates are age-adjusted using the projected 2000 U.S. population as the standard population and four age groups: 18-24, 25-44, 45-64, and 65 and over. Estimates are based on household interviews of a sample of the civilian noninstitutionalized population. SOURCE: CDC/NCHS, National Health Interview Survey, 2002, 2007 and 2012.

Figure 1. Use of yoga, tai chi, and qi gong among adults in the past 12 months: United States, 2002, 2007, and 2012

From: Trends in the use of complementary health approaches among adults: United States, 2002-2012, Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL, National Health Statistics Report, 79:1-16, 2015.











San Francisco International Airport, California



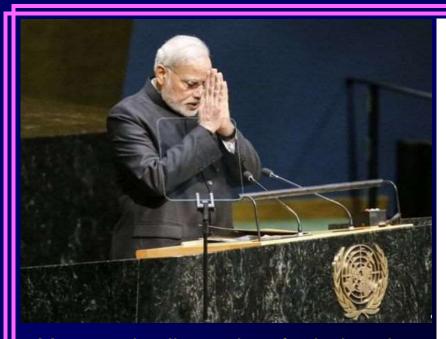
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Dallas-Fort Worth International Airport, Texas



Burlington International Airport, Vermont



Yoga embodies unity of mind and body; thought and action; restraint and fulfillment; harmony between man and nature; a holistic approach to health and well being. It is not about exercise but to discover the sense of oneness with yourself, the world and the nature.

...Let us work towards adopting an International Yoga Day

United Nations





Distr.: General 9 January 2015

Sixty-ninth session Agenda item 124

#### Resolution adopted by the General Assembly on 11 December 2014

[without reference to a Main Committee (A/69/L.17 and Add.1)]

#### 69/131. International Day of Yoga

The General Assembly,

Recalling its resolutions 66/2 of 19 September 2011 on the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases and 68/98 of 11 December 2013 on global health and foreign policy,

*Reaffirming* General Assembly resolutions 53/199 of 15 December 1998 and 61/185 of 20 December 2006 on the proclamation of international years, and Economic and Social Council resolution 1980/67 of 25 July 1980 on international years and anniversaries,

Noting the importance of individuals and populations making healthier choices and following lifestyle patterns that foster good health,

Underscoring the fact that global health is a long-term development objective that requires closer international cooperation through the exchange of best practices aimed at building better individual lifestyles devoid of excesses of all kinds.

Recognizing that yoga provides a holistic approach to health and well-being,

Recognizing also that wider dissemination of information about the benefits of practising yoga would be beneficial for the health of the world population,

1. Decides to proclaim 21 June the International Day of Yoga;

 Invites all Member and observer States, the organizations of the United Nations system and other international and regional organizations, as well as civil society, including non-governmental organizations and individuals, to observe the International Day of Yoga, in an appropriate manner and in accordance with national priorities, in order to raise awareness of the benefits of practising yoga;

Stresses that the cost of all activities that may arise from the implementation of the present resolution should be met from voluntary contributions;

 Requests the Secretary-General to bring the present resolution to the attention of all Member and observer States and the organizations of the United Nations system.



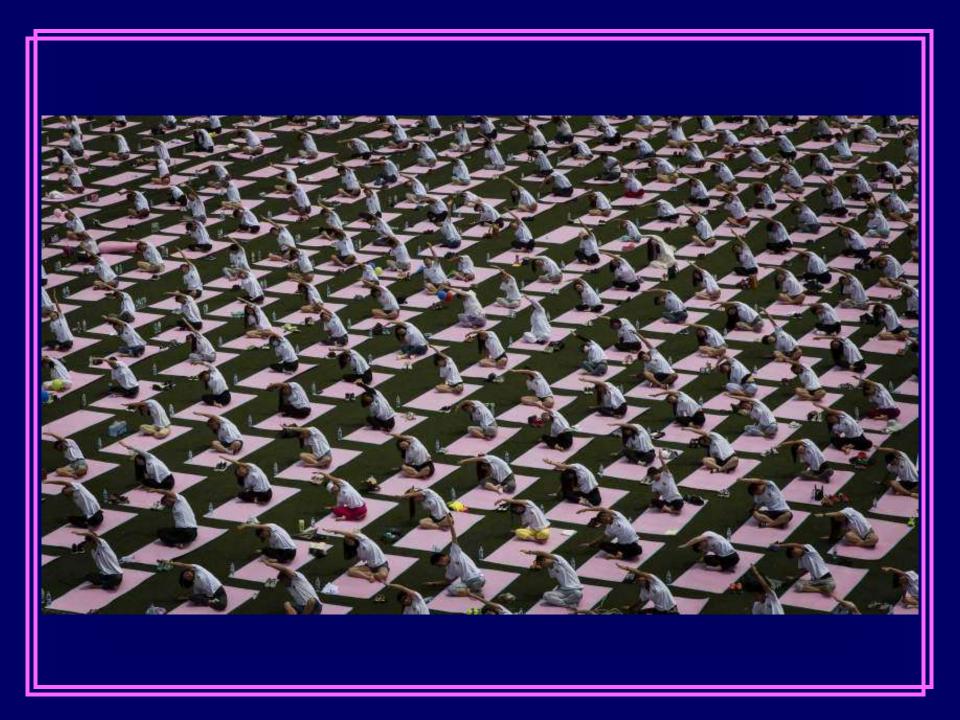


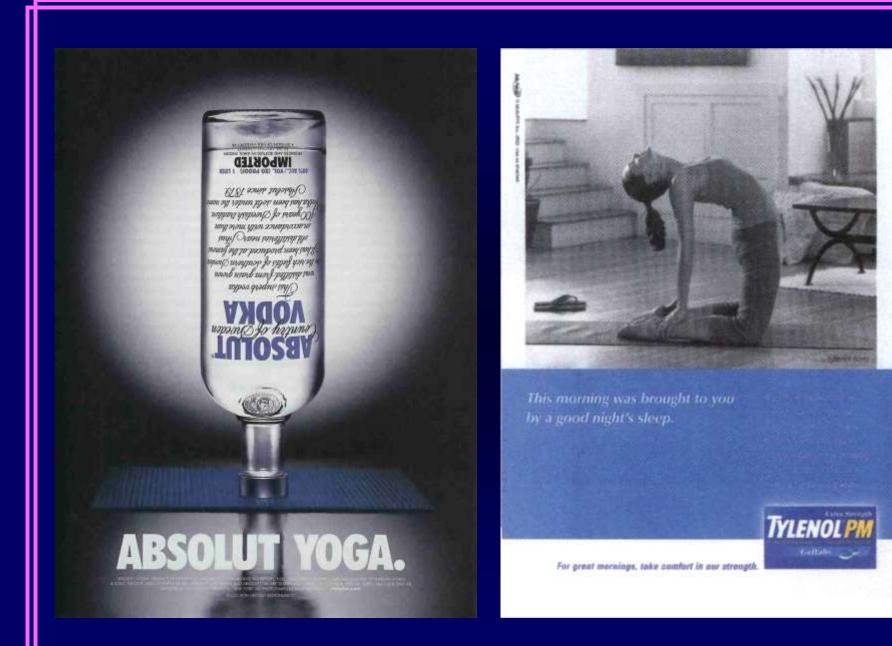














Try the **NEW** Asian Salad a new way to cool down after exercise.

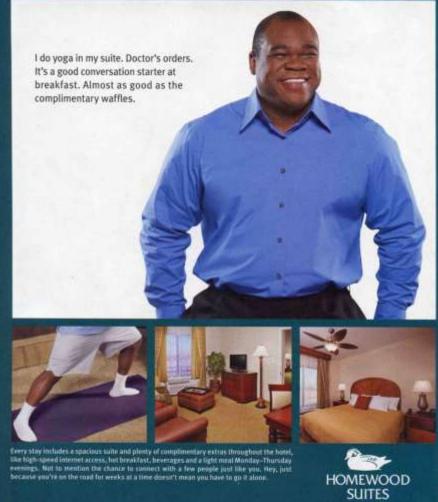
Click on a DVD to get more information about each workout.



### ACHIEVE BALANCE.







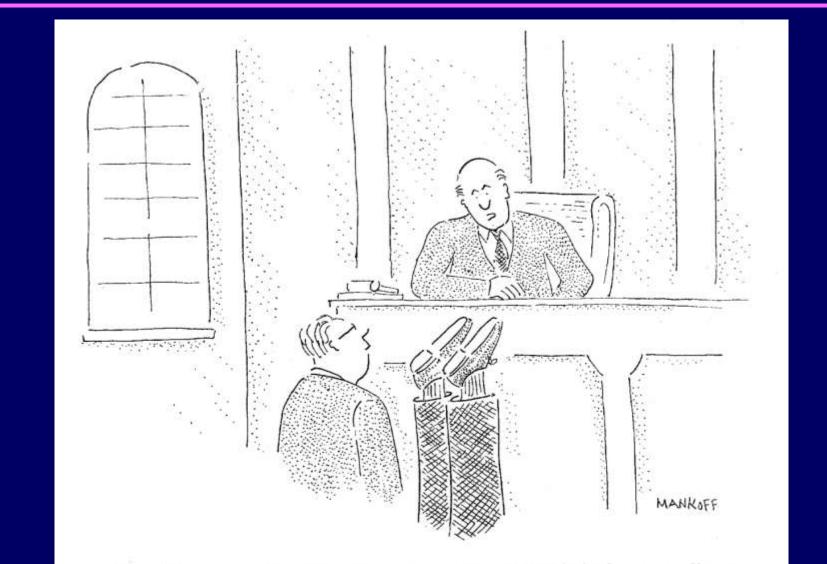
## I do yoga in my suite. Doctor's orders.

- Hilton ----

Make Yourself at Home:

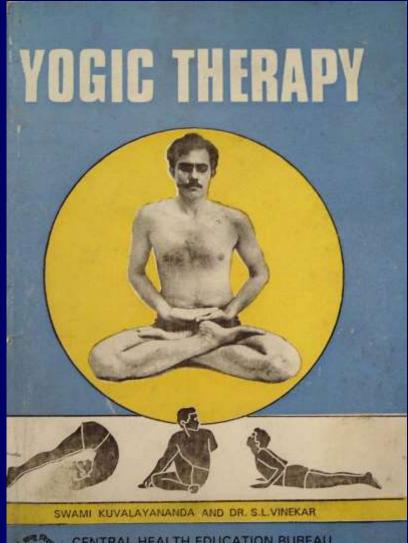


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"Frankly, counsellor, I don't care how stressful this is for your client tell him to get out of that damn yoga position."

# Prevalence of Yoga as Therapy



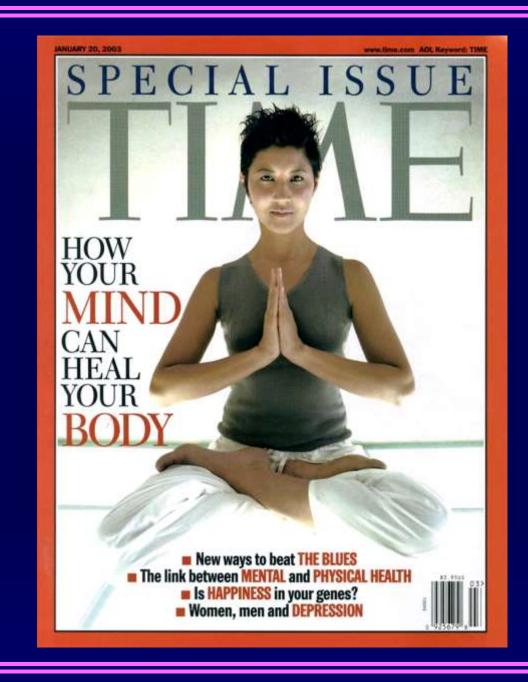
CENTRAL HEALTH EDUCATION BUREAU DIRECTORATE GENERAL OF HEALTH SERVICES KOTLA ROAD, NEW DELHI.

"Read this to find out why we teach our patients YOGA." -Mehmet Oz, M.D., author of YOU: The Owner's Manual as medicini THE YOGIC PRESCRIPTION FOR HEALTH AND HEALING



A Yoga Journal Book by Timothy McCall, M.D.





ADVERTISEMENT

### The Perfect Post-Yoga Snack

AFTER YOGA CLASS TRY THIS DELICIOUS, EASY-TO-MAKE SMOOTHIE PACKED WITH GREAT FLAVORS.

#### **Mixed Berry Smoothie**

Super taste, certainly. But this smoothie also contains "super foods"—berries rich in vitamins and antioxidants.

MAKES ONE 12-OUNCE SERVING

- 1/3 cup orange juice
- 1/3 cup fresh strawberries (about 5 medium)
- 1/3 cup fresh raspberries
- 1/3 cup fresh blueberries
- 1 cup ice cubes
- Combine all ingredients in a blender and process on high speed until smooth, about 45 seconds. Pour into a glass and enjoy.

Talk to your doctor before starting any diet or mercise program.

Can't make it to yoga class? Carve out a few minutes a day to meditate. Here are some easy tips to get you started:

 Add meditation to your routine. Set aside at least 5–10 minutes twice a day for quiet reflection.

 Set the right mood. Choose a quiet room in your house that allows you to tune out noise. And turn off all devices that might interrupt you.

 Be mindful of breathing. Let your whole body relax as you begin to take deep breaths—it will help you focus on your meditation.

To find more everyday recipes you might be interested in, go to www.EverydayBite.com.

www.inverstayfolle.com is a property of Hearst Communications, Inc. and is neither owned nor controlled by Pfizer. Pfizer is not responsible for the content or services of this site. Can't make it to yoga class? Carve out a few minutes a day to meditate. Here are some easy tips to get you started:

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#### Mixed Berry Smoothie

Super taste, certainly. But this smoothie also costains "super foods"----bonies rich in vitamine and antoxidants.

#### MAKES ONE 12-OUNCE SERVING

- 1/3 cup orange julce 1/3 cup trush strawborries, (about 5 metham)
- Vi cop trest mipbornes.
- 10 cup lives blasterias:
- 1 cup ice outers
- 1. Combine all ingredients in a blendler and process on high
- speed with smooth, about 45 seconds. Pour rate a glass and energy

has to your darks taken darking drip the or medicine program.

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To find more everyday recipes you might be interested in, go to www.EverydayBite.com.



If depression in affecting the way you teal about yourself, talk to your doctor about your condition and ask if PRISTIQ\* may be right for you. Visit www.Pristlo.com or call 1-800-PRISTIQ (1-800-774-7847).

Plane we important safety information about Pristig on the following two pages.

#### DOES DEPRESSION HOLD YOU BACK FROM WHAT YOU ENJOY?

Depression is a serious medical condition that can make you feel sad, helpless and uninterested in your favorite activities. Sometimes, it can make you feel like you have to wind yourself up; PRISTIQ® (desveniafaxine) 50 mg is FDA-approved to treat depression, and is believed to work on two chemicals in the brain, serotonin and norepinephrine. PRISTIQ offers free education and support. If depression is affecting the way you feel about yourself, treating it may help. Ask your doctor if PRISTIQ may be right for you.

> Pristiq desveniataxine PRISTIQ could be a key in treating your depression.

Visit Pristiq.com or call 1-800-PRISTIQ (1-800-774-7847) PRISTIQ is a prescription medication approved for the treatment of major depressive disorder in adults.

Important Safety Information About PRISTIQ

Suicidality and Antidepressant Drugs Antidepressants increased the risk compared to placebo of suicidal thinking and behavior (suicidality) in children, teens, and young adults. Depression and certain other psychiatric disorders are themselves associated with increases in the risk of suicide.

Patients of all ages who are started on antidepressant therapy or when the dose is changed should be monitored appropriately and observed closely for clinical worsening, suicidality, or unusual changes in behavior such as becoming agitated, irritable, hostile, aggressive, impulsive, or restless. Should these occur, report them to a doctor. PRUSTQ is not approved for use in children under 18.

People taking MAOIs should not take PRISTIQ. Tell your healthcare professional about all prescription and over-the-counter medications you are taking or plan to take, including: medicines to treat migraines or psychiatric disorders, to avoid a potentially life-threatening condition: and espirin, VSAD pain relievers, or blood thinners because they may increase the risk of bleeding.

PRISTIQ may cause or make some conditions worse, so

tell your healthcare professional about all your medical conditions, including:

- High blood pressure, which should be controlled before you start taking PRISTIQ and monitored regularly
- Heart problems, high cholesterol or triglyceride levels or a history of stroke, glaucoma or increased eye pressure, kidney or liver problems, low sodium levels in your blood
   Have or had bleeding problems
- Have or had depression, suicidal thoughts or behavior
   Mania, bipolar disorder, or seizures or convulsions
   If nursing, pregnant, or plan to become pregnant

Discontinuation symptoms may occur when stopping or reducing PRISTIQ, so talk to your healthcare professional before stopping or changing your does of PRISTIQ. Until you see how PRISTIQ affects you, be careful driving a cor or operating machinery. Avoid drivinking alcohol while taking PRISTIQ. Side effects when taking PRISTIQ 50 mg may include nauses, dizziness, sweating, constipation, and decreased appetite.

Please see Important Risk Information for PRISTIQ on the following page.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, pr call 1-800-FDA-1088.

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"Thanks to yoga, I now gently stretch to conclusions instead of jumping to them"

# Yoga Research in Perspective



# Why Not Do Research on Yoga?

## Costly

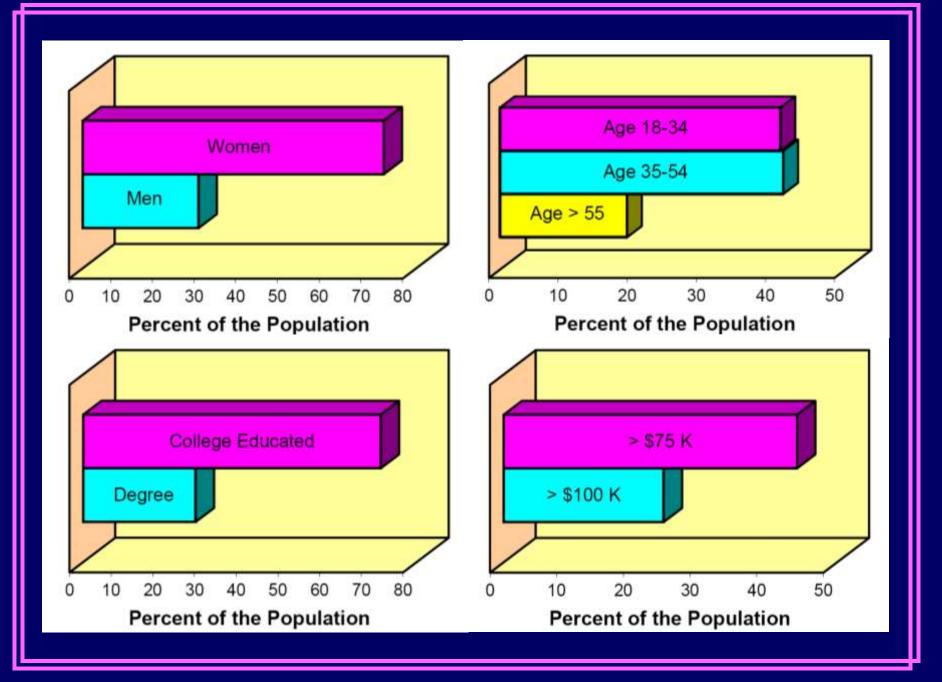
- \$2 million full study
- \$700 K preliminary study

# Lengthy

- full study 5 years, preliminary study 3 years
- requires replication and critical mass
- Reductionist / Dualistic / Dehumanizing

# Why Do Research on Yoga?

- Because a significant fraction of the population is using it as a therapy
- To promote its use by the general public
- To reach populations that ordinarily do not have access to and/or knowledge of yoga



# Penetrating the Population

Two systems are in place in society that penetrate to all levels of the population

- The education system
- The healthcare system

Both systems require validation of techniques and procedures before implementation

# **Penetrating the Population**

### **Dental Hygiene in Education and Healthcare**

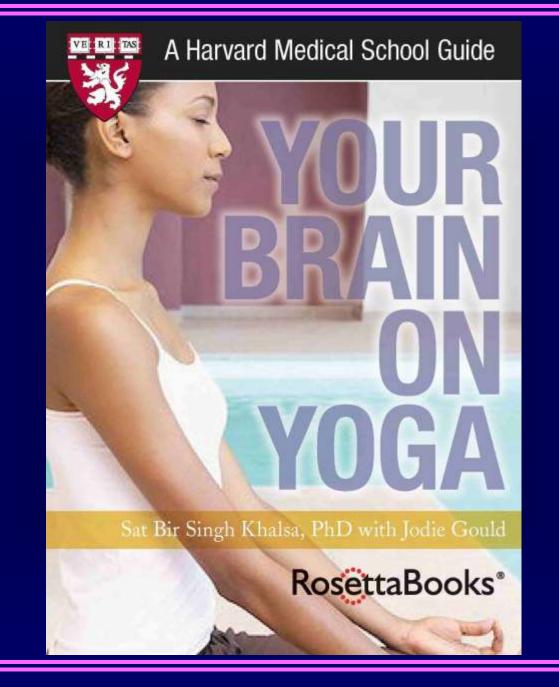
- Fully accepted in principle by these systems
- Taught & promoted in these systems
- Widespread adoption in society as a cultural norm

### Mind-Body Hygiene (Yoga)

- NOT accepted in principle by these systems
- NOT taught and promoted in these systems
- Growing but narrow adoption in society as a cultural norm

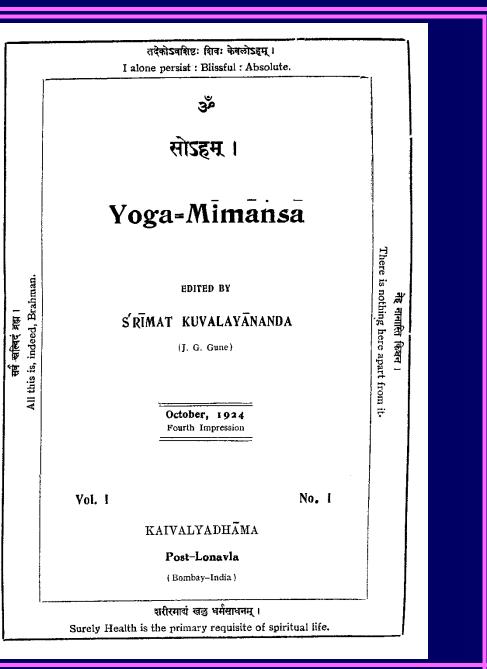


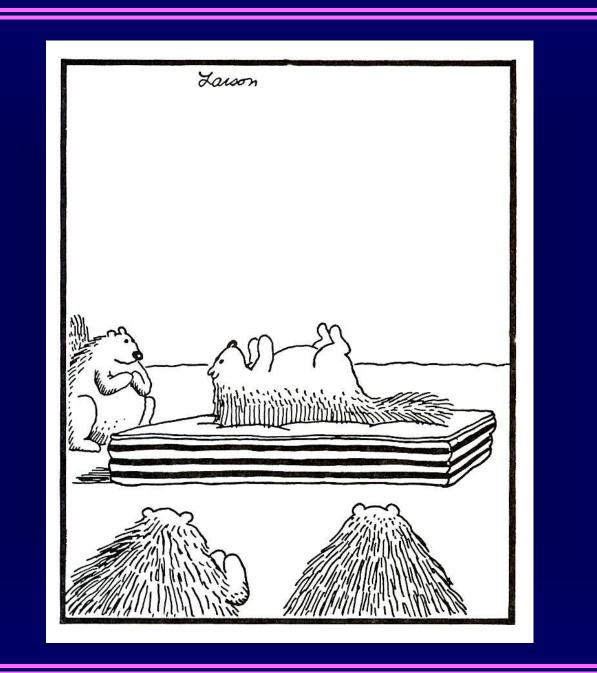
Review of Basic Yoga Research



# Yoga Mimamsa • Swami Kuvalayananda and colleagues at Kaivalyadhama Laboratory, Lonavla starting in 1924.

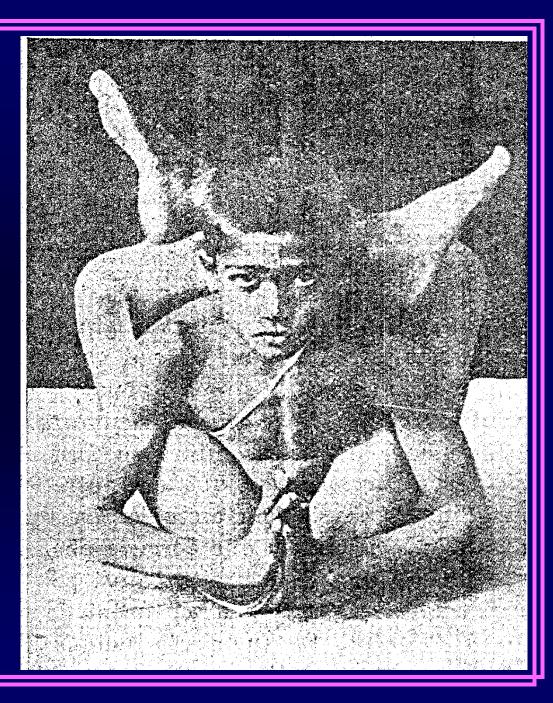
 56 papers by Kuvalayananda from 1924-34 and 1954-73



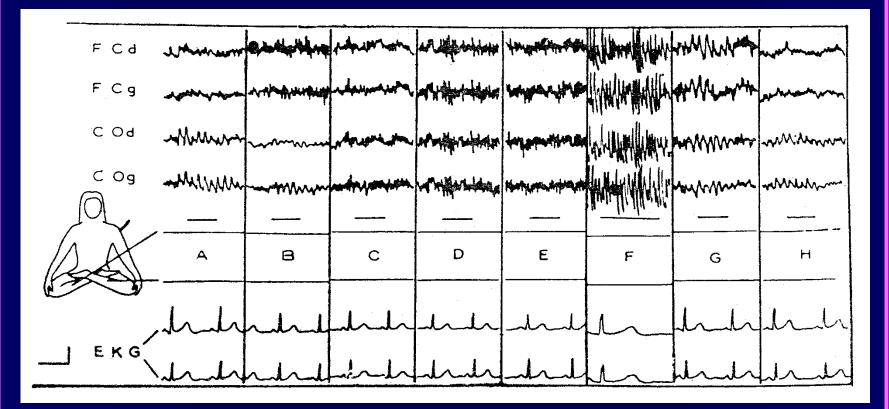


## **Brosse, 1936**

From: Documents recueillis aux Indes sur les "Yoguis" par l'enregistrement simultane du pouls, de la respiration et de l'electrocardiogramme [Data gathered in India on a Yogi with simultaneous registration of the pulse, respiration, and electrocardiogram] Laubry C, Brosse T La Presse Medicale 44:1601-1604, 1936.



# Das and Gastaut, 1955



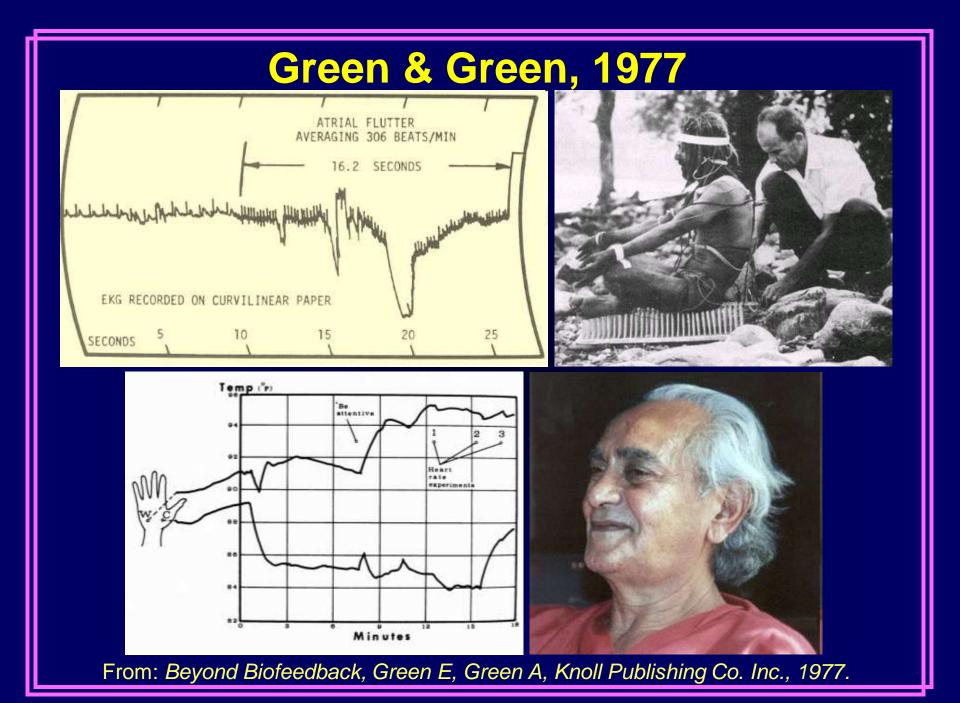
From: Variations de l'activite electrique du cerveau, du coeur et de muscles squelettiques au cours de la meditation et de l'extase yogique [Variations in the electrical activity of the brain, heart, and skeletal muscles during yogic meditation and trance], Das N, Gastaut H, Electoencephalography and Clinical Neurophysiology, Suppl. 6:211-219, 1955.

# **Bagchi and Wenger, 1957**

"...physiologically Yogic meditation represents deep relaxation of the autonomic nervous system without drowsiness or sleep ..."



From: Electro-physiological correlates of some Yogi exercises, Bagchi BK, Wenger MA, Electroencephalography and Clinical Neurophysiology, 7 (Suppl):132-149, 1957.



PLOS ONE

### Relaxation Response Induces Temporal Transcriptome Changes in Energy Metabolism, Insulin Secretion and Inflammatory Pathways

Manoj K. Bhasin<sup>1,4,5</sup><sup>\*</sup>, Jeffery A. Dusek<sup>6</sup><sup>\*</sup>, Bei-Hung Chang<sup>7,8</sup><sup>\*</sup>, Marie G. Joseph<sup>5</sup>, John W. Denninger<sup>1,2</sup>, Gregory L. Fricchione<sup>1,2</sup>, Herbert Benson<sup>1,3</sup><sup>¶</sup>, Towia A. Libermann<sup>1,4,5</sup>\*<sup>¶</sup>

PLOS ONE | www.plosone.org

1

May 2013 | Volume 8 | Issue 5 | e62817

"RR practice enhanced expression of genes associated with energy metabolism, mitochondrial function, insulin secretion and telomere maintenance, and reduced expression of genes linked to inflammatory response and stress-related pathways."

#### Psychoneuroendocrinology (2013) 38, 348-355

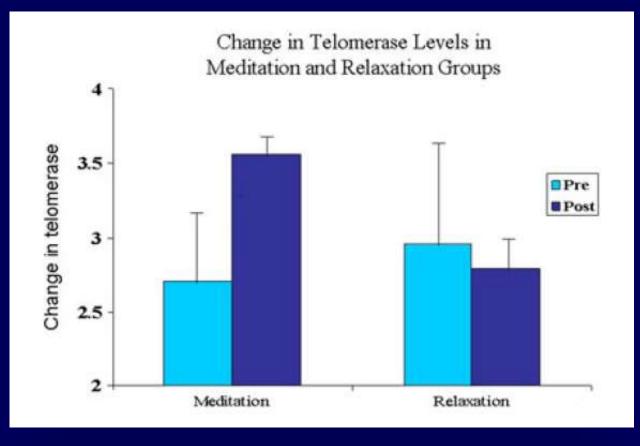


### Yogic meditation reverses NF-kB and IRF-related transcriptome dynamics in leukocytes of family dementia caregivers in a randomized controlled trial

David S. Black<sup>a</sup>, Steve W. Cole<sup>a,b,c</sup>, Michael R. Irwin<sup>a,b</sup>, Elizabeth Breen<sup>a,b</sup>, Natalie M. St. Cyr<sup>b</sup>, Nora Nazarian<sup>b</sup>, Dharma S. Khalsa<sup>d</sup>, Helen Lavretsky<sup>b,\*</sup>

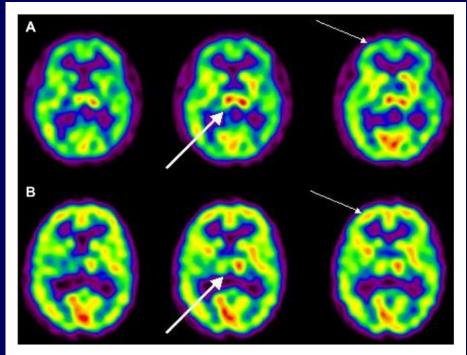
"...the effects of Kirtan Kriya suppressing expression of inflammation-related genes and up-regulating expression of genes involved in antiviral and immunoglobulin responses..."

# **Yoga Meditation on Telomerase**



From: A pilot study of yogic meditation for family dementia caregivers with depressive symptoms: effects on mental health, cognition, and telomerase activity, Lavretsky H, Epel ES, Siddarth P, Nazarian N, St. Cyr N, Khalsa DS, Lin J, Blackburn E, Irwin MR, International Journal of Geriatric Psychiatry, (2012).

# Yoga Meditation and Cerebral Blood Flow



#### Non-meditators

#### Meditators

CBF of long-term meditators was significantly higher (p < .05) compared to nonmeditators in the prefrontal cortex, parietal cortex, thalamus, putamen, caudate, and midbrain...The observed changes...appear in structures that underlie the attention network and also those that relate to emotion and autonomic function.

From: Cerebral blood flow differences between long-term meditators and nonmeditators, Newberg AB, Wintering N, Waldman MR, Amen D, Khalsa DS, Alavi A. Conscious Cognition, 19:899-905, 2010.

# Yoga, Thalamic GABA, Mood & Anxiety

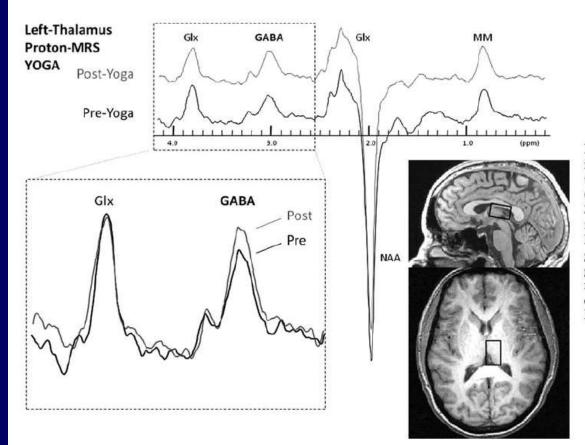
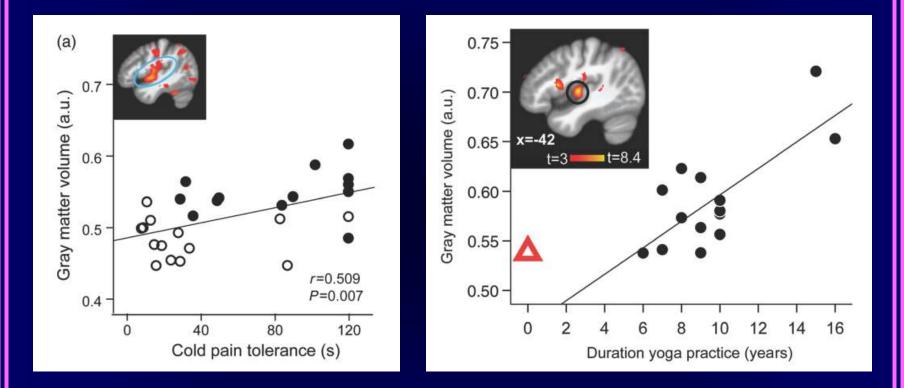


FIG. 2. Spectral data showing an increase in the area of the edited  $\gamma$ -aminobutyric acid (GABA) resonance doublet at 3.00 parts per million (ppm) from scan 2 to scan 3 for the left thalamic voxel in the yoga group. Glx, glutamate and glutamine complex; MRS, magnetic resonance spectroscopy; NAA, N-acetylaspartate; MM, macromolecules.

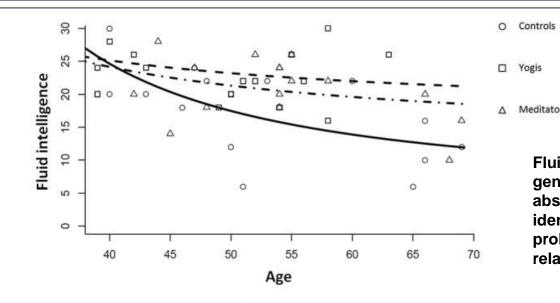
From: Effects of yoga versus walking on mood, anxiety, and brain GABA levels: a randomized controlled MRS study, Streeter CC, Whitfield TH, Owen L, Rein T, Karri SK, Yakhkind A, Perlmutter R, Prescot A, Renshaw PF, Ciraulo DA, Jensen JE. Journal of Alternative and Complementary Medicine, 16:1145-52, 2010.

# Yoga, Brain Structure and Pain



From: Insular Cortex Mediates Increased Pain Tolerance in Yoga Practitioners, Villemure C, Ceko M, Cotton VA, Bushnell MC, Cerebral Cortex, 24:2732-40), 2014.

# **Yoga and Fluid Intelligence**

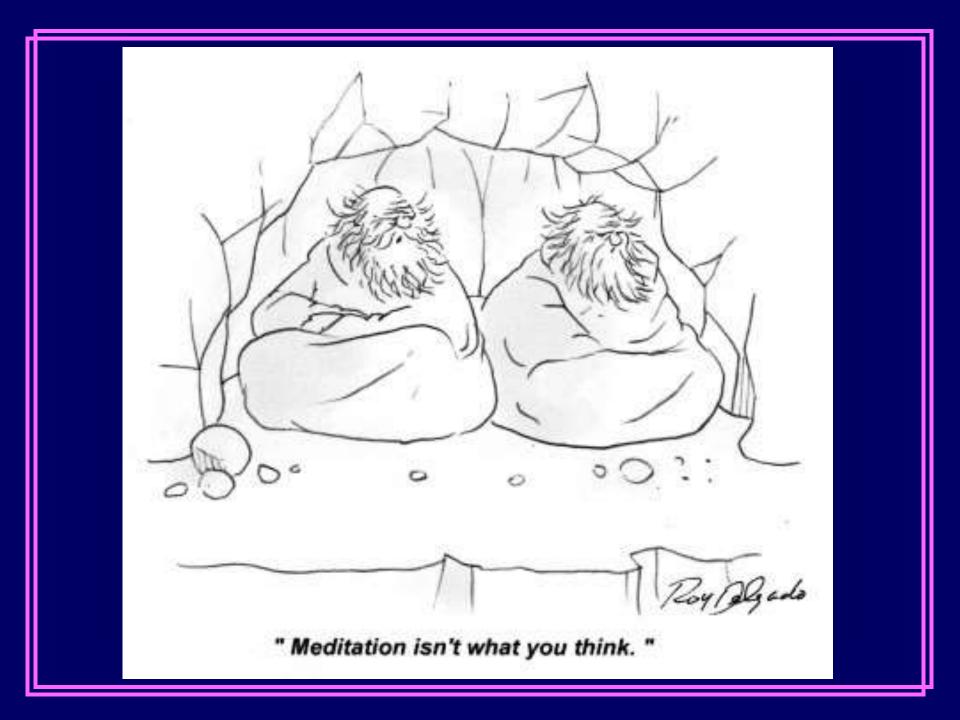


Fluid intelligence is the general ability to think abstractly, reason, identify patterns, solve problems, and discern relationships.

FIGURE 1 | Relation between age, measured in years and fluid intelligence measured with the Raven's Advanced Progressive Matrices for controls, yoga practitioners, and meditators. Lines represent log-linear regression lines for the three groups following the function log(F) = A/age + log(F<sub>f</sub>).

These findings reveal the possibility to increase resilience and to slow the decline of fluid intelligence and brain functional architecture and suggest that mindfulness plays a mechanistic role in this preservation.

From: Fluid intelligence and brain functional organization in aging yoga and meditation practitioners, Gard T, Taquet M, Dixit R, Hölzel BK, de Montjoye YA, Brach N, Salat DH, Dickerson BC, Gray JR, Lazar SW, Frontiers in Aging Neuroscience, 6:76, 2014.



## Annapurna Upanishad

III-5. ...this mind of mine is extremely restless'.III-6. The mind wanders among objects as a monkey does from tree to tree.

## Katha Upanishad

1-III-9. But the man who has a discriminating intellect as his driver, and a controlled-mind as the reins, reaches the end of the path – that supreme state of Vishnu.

From: Vedanta Spiritual Library http://www.celextel.org/

# BREVIA

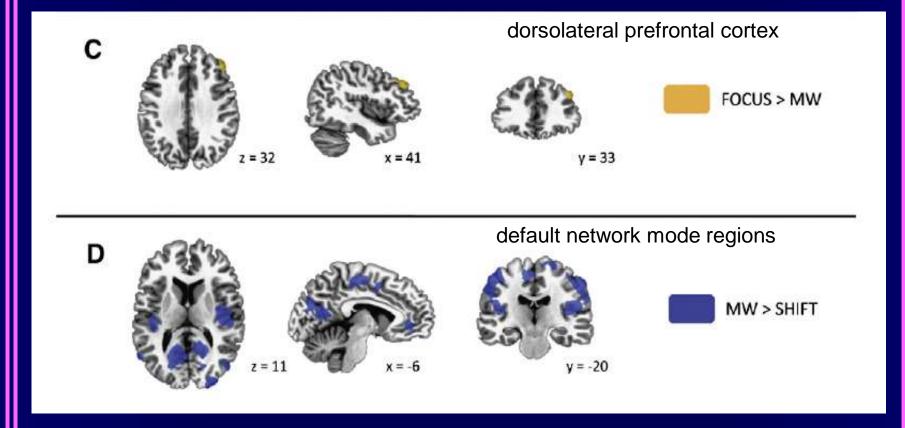
# A Wandering Mind Is an Unhappy Mind

Matthew A. Killingsworth\* and Daniel T. Gilbert

12 NOVEMBER 2010 VOL 330 SCIENCE www.sciencemag.org

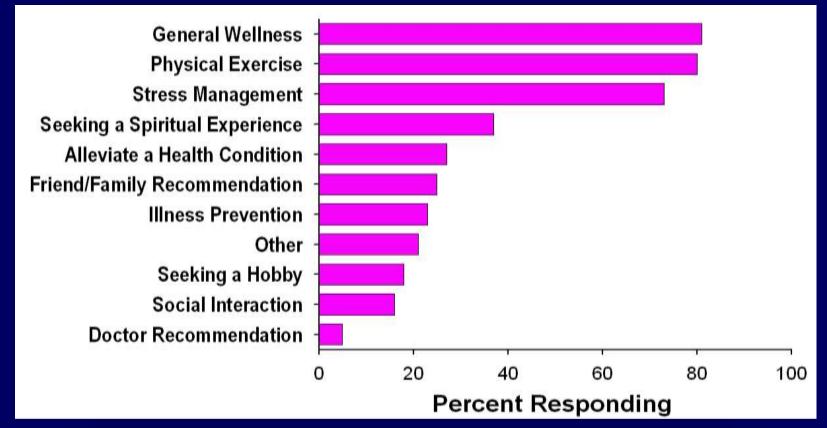
...people's minds wandered frequently, regardless of what they were doing ...people were less happy when their minds were wandering than when they were not

# **Meditation & the Default Mode Network**



From: Mind wandering and attention during focused meditation: A fine-grained temporal analysis of fluctuating cognitive states, Hasenkamp W, Wilson-Mendenhall CD, Duncan E, Barsalou LW, Neuroimage, 59:750-60, 2012.

# Reasons for Practice in a Beginners Program



From: Yoga in the real world: Perceptions, motivators, barriers, and patterns of use, Quilty MT, Saper RB, Goldstein R, Khalsa SBS, Global Advances in Health and Medicine, 2:44-49, 2013. **Topical Review Article** 

#### Yoga as an Alternative and Complementary Approach for Stress Management: A Systematic Review

Journal of Evidence-Based Complementary & Alternative Medicine 2014, Vol 19(1) 59-67 © The Author(s) 2013 Reprints and permission: sagepub.com/journalsPermissions.nav DOI: 10.1177/2156587213503344 cam.sagepub.com



#### Manoj Sharma, MBBS, MCHES, PhD, FAAHB<sup>1</sup>

#### Abstract

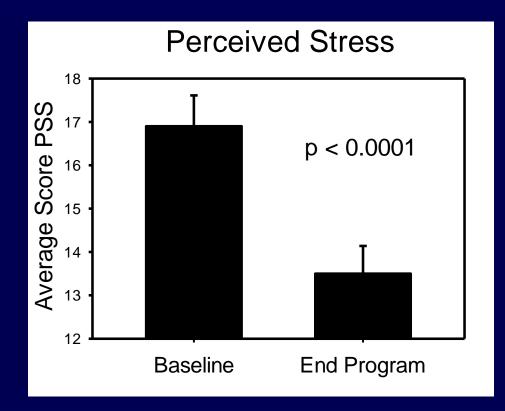
Stress has become a global public health problem. Yoga offers one possible way of reducing stress. The purpose of this study was to look at studies from 2011 to May 2013 and examine whether yoga can be an efficacious approach for managing stress. A systematic search of Medline, CINAHL, and Alt HealthWatch databases was conducted for quantitative articles involving all schools of yoga. A total of 17 articles met the inclusion criteria. Six of these were from the United States, 3 from India, 2 from the United Kingdom, and 1 each from Australia, Brazil, Germany, Iraq, Sweden, and Taiwan. Of the 17 studies, 12 demonstrated positive changes in psychological or physiological outcomes related to stress. Despite the limitations, not all studies used a randomized controlled design, had smaller sample sizes, had different outcomes, had nonstandardized yoga intervention, and had varying lengths, yoga appears to be a promising modality for stress management.

#### Keywords

yoga, mind-body interventions, stress, anxiety

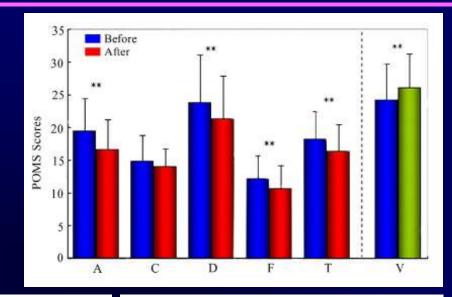
Received May 28, 2013. Accepted for publication August 1, 2013.

# **Stress in Beginner Yoga Students**



From: Yoga as a stress reduction technique for women, Quilty M, Khalsa SBS, Saper R, Abstract submitted to 137th APHA Annual Meeting & Exposition, 2009.

Attention, Stress & Mood



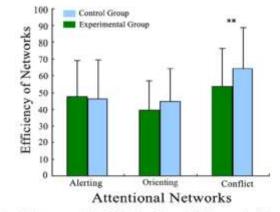
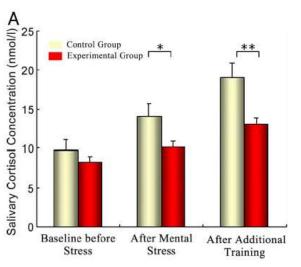
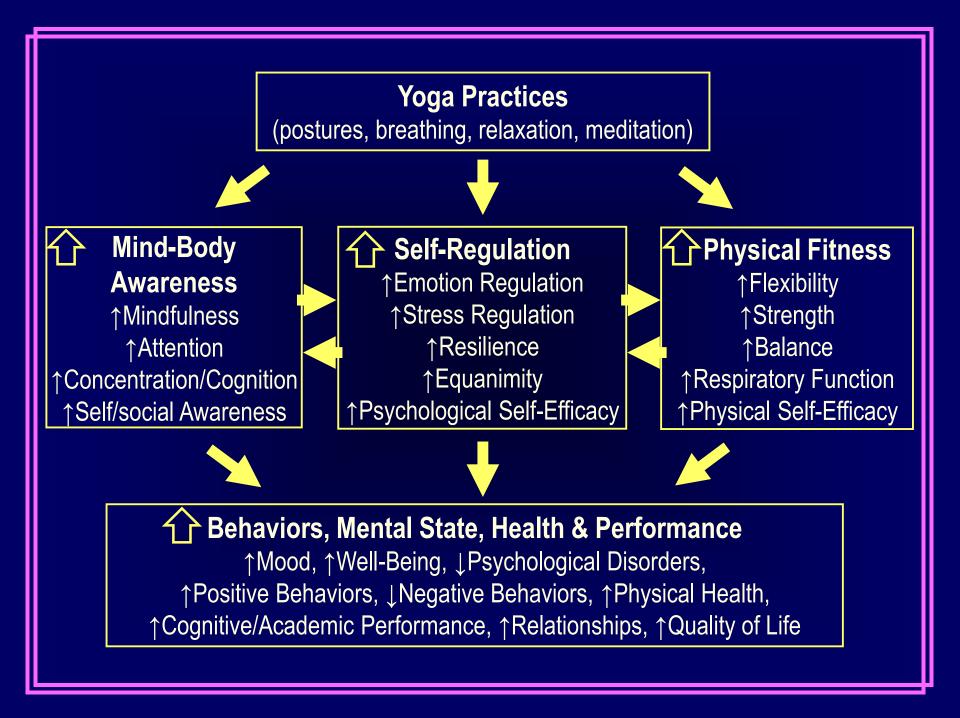


Fig. 1. Performance of the ANT after 5 days of IBMT or control. Error bars indicate 1 SD. Vertical axis indicates the difference in mean reaction time between the congruent and incongruent flankers. The higher scores show less efficient resolution of conflict.



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# **Temporal Changes in Yoga Practice**

Arousal reduction, physical/mental well-being

Mind/body awareness, resilience, self-regulation

Psychological / philosophical transformation



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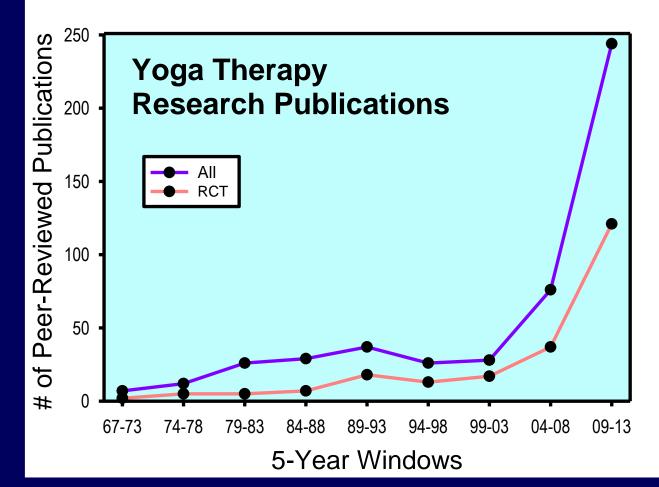
Review of Applied Yoga Research

# Chronology of Yoga Therapy Research



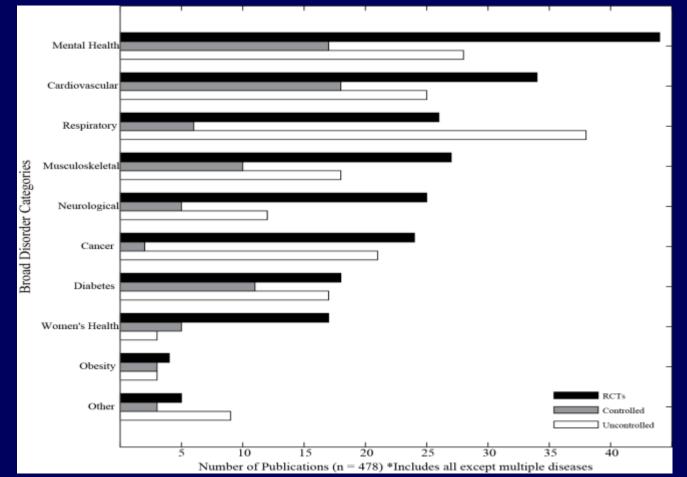
From: Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013, Jeter PE, Slutsky J, Singh N, Khalsa SBS, Journal of Alternative and Complementary Medicine, 2015.

# **Chronology of Yoga Therapy Research**



From: Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013, Jeter PE, Slutsky J, Singh N, Khalsa SBS, Journal of Alternative and Complementary Medicine, 2015.

# Yoga Therapy Research by Disorders



From: Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967-2013, Jeter PE, Slutsky J, Singh N, Khalsa SBS, Journal of Alternative and Complementary Medicine, 2015.

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Yoga: a therapeutic approach. Nayak NN, Shankar K. Phys Med Rehabil Clin N Am. 2004 Nov;15(4):783-98.

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### **Review** Article

### Effects of Yoga on Mental and Physical Health: A Short Summary of Reviews

Hindawi Publishing Corporation Evidence-Based Complementary and Alternative Medicine Volume 2012, Article ID 165410, 7 pages doi:10.1155/2012/165410

## Arndt Büssing,<sup>1</sup> Andreas Michalsen,<sup>2</sup> Sat Bir S. Khalsa,<sup>3</sup> Shirley Telles,<sup>4</sup> and Karen J. Sherman<sup>5</sup>

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<sup>4</sup> Director of Research, Patanjali Research Foundation, Haridwar 249405, India

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Academic Editor: Vernon A. Barnes

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This report summarizes the current evidence on the effects of yoga interventions on various components of mental and physical health, by focussing on the evidence described in review articles. Collectively, these reviews suggest a number of areas where yoga may well be beneficial, but more research is required for virtually all of them to firmly establish such benefits. The heterogeneity among interventions and conditions studied has hampered the use of meta-analysis as an appropriate tool for summarizing the current literature. Nevertheless, there are some meta-analyses which indicate beneficial effects of yoga interventions, and there are several randomized clinical trials (RCT's) of relatively high quality indicating beneficial effects of yoga for pain-associated disability and mental health. Yoga may well be effective as a supportive adjunct to mitigate some medical conditions, but not yet a proven stand-alone, curative treatment. Larger-scale and more rigorous research with higher methodological quality and adequate control interventions is highly encouraged because yoga may have potential to be implemented as a beneficial supportive/adjunct treatment that is relatively cost-effective, may be practiced at least in part as a self-care behavioral treatment, provides a life-long behavioural skill, enhances self-efficacy and self-confidence and is often associated with additional positive side effects.



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- Medical Editor, Yoga Journal

# THE PRINCIPLES AND PRACTICE OF YOGA IN HEALTH CARE



Sat Bir Khalsa • Lorenzo Cohen Timothy McCall • Shirley Telles



# Yoga for Health and Prevention

# Non-communicable Diseases (NCDs)

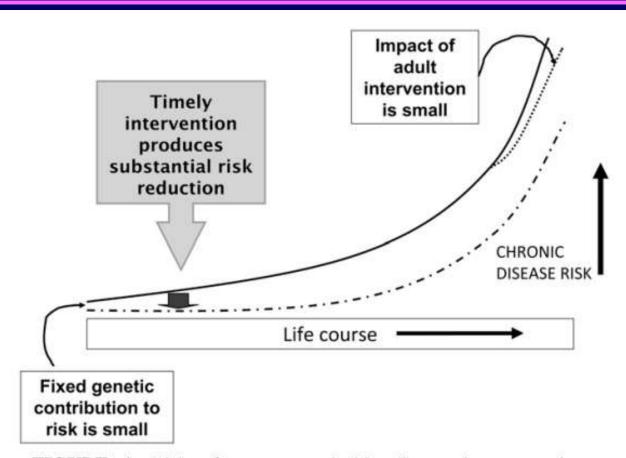
...NCDs are the leading cause of death in the world...

In most middle- and high-income countries NCDs were responsible for more deaths than all other causes of death combined...

Noncommunicable Diseases, Country Profiles, World Health Organization, 2011

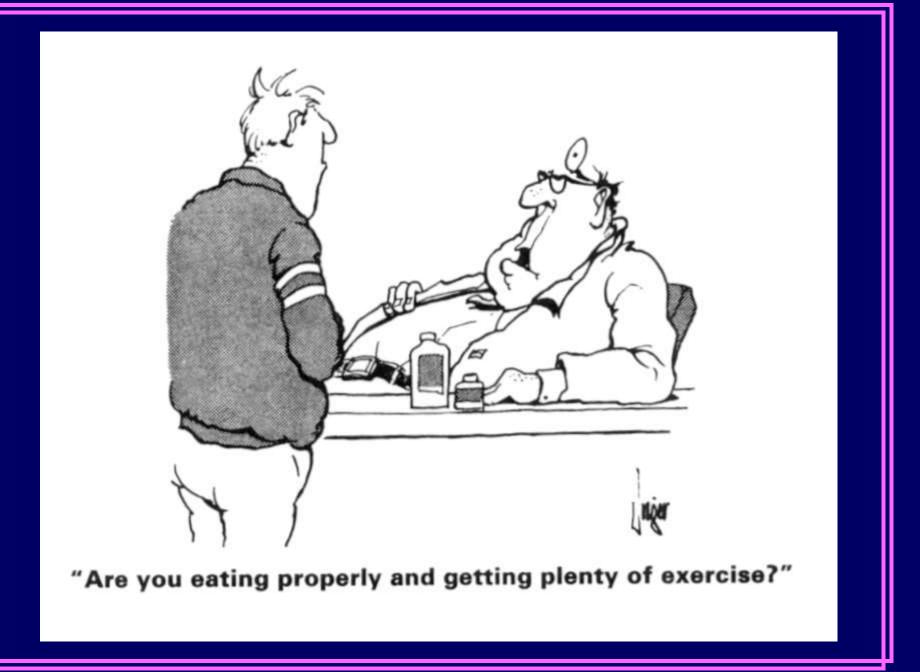
...NCD deaths are projected to increase by 15% globally between 2010 and 2020 (to 44 million deaths).

Global status report on noncommunicable diseases 2010 World Health Organization



**FIGURE 1.** Risk of noncommunicable disease increases along a trajectory through the life course, contrasting with models on the basis of infectious disease. The inherited, fixed genetic variation makes only a small contribution to later risk. In addition, because they occur too late, adult lifestyle interventions reduce risk to only a small degree or transiently. The maximum effect will be gained from timely interventions in early life when plasticity permits a sustained reduction in the trajectory of risk to be attained.

From: Developmental origins of noncommunicable disease: population and public health implications, Hanson M, Gluckman P, American Journal of Clinical Nutrition, 94:1754S–8S, 2011.



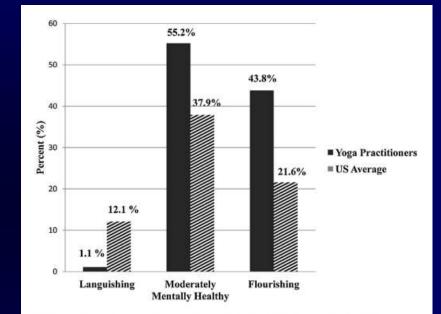
# **Prevention vs. Disease Care**



Stress Awareness Worldview

## **Yoga Practice Associations**

Health variable	Percent
General health	
Excellent	38.8
Very good	46.3
Good	13.0
Fair	1.6
Poor	0.3
Smoking history	
Never smoked	54.7
Quit smoking	43.3
Still smoking	2.0
Physical activity catego	ry
Low	16.8
Moderate	37.9
High	45.3



**Figure 2** Comparison of mental health (mental health measured using Mental Health Continuum-short form) of yoga practitioners to national norms (national norms from the Midlife in the United States (MIDUS) study).

From: National survey of yoga practitioners: mental and physical health benefits, Ross A, Friedmann E, Bevans M, Thomas S, Complementary Therapies Medicine, 21:313-23, 2013.

# **Perceptions of Yoga on Health**

Table 5 Results of Likert scale<sup>a</sup> questions about subject's beliefs regarding the impact of yoga on various aspects of health (n = 1045).

Belief about yoga and health	Level of agreement				
	Strongly disagree/ disagree Frequency (%)	Neither agree nor disagree Frequency (%)	Agree/ strongly agree Frequency (%)		
My sleep is better because of yoga	50 (4.8%)	279 (26.7%)	716 (68.5%)		
My energy level is better because of yoga	34 (3.3%)	128 (12.2%)	883 (84.5%)		
My health has improved because of yoga	35 (3.3%)	75 (7.2%)	935 (89.5%)		
My diet is better because of yoga $(n = 1027)$	107 (10.4%)	438 (42.6%)	482 (47.0%)		
Yoga has helped me to attain or maintain a healthier weight $(n = 1012)$	101 (10.0%)	331 (32.7%)	580 (57.3%)		
I drink less or no alcohol because of yoga	300 (28.7%)	513 (49.1%)	232 (22.2%)		
My relationships with others are better because of yoga	57 (5.5%)	287 (27.5%)	700 (67.0%)		
I am happier because of yoga	36 (3.3%)	107 (10.2%)	903 (86.5%)		

<sup>a</sup> All questions used a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, or strongly agree).

From: National survey of yoga practitioners: mental and physical health benefits, Ross A, Friedmann E, Bevans M, Thomas S, Complementary Therapies Medicine, 21:313-23, 2013.

## **BMI in Yoga Practitioners**

Table 2: Body mass index distributions based on lifetime hours of yoga experience

Lifetime hours of yoga experience	N	Mean BMI (SD)
0	143	29.37 (7.37)
1 to 2,500	96	24.04 (3.94)
2,501 to 5,000	60	23.64 (4.64)
5,000 to 7,500	18	22.69 (3.80)
7,500 to 10,000	14	22.73 (3.57)
10,000 to 12,500	7	22.39 (4.15)
12,500 to 15,000	5	21.18 (1.55)
More than 15,000	8	19.74 (1.31)
Total	351	25.85 (6.37)

From: Increased Hatha yoga experience predicts lower body mass index and reduced medication use in women over 45 years, Moliver N, Mika E, Chartrand M, Burrus S, Haussmann R, Khalsa S, International Journal of Yoga, 4:77-86, 2011.

## **Medications in Yoga Practitioners**

Number of medications	Yoga practitioners	Non-practitioners	All participants
0	97 (46.0)	43 (23.6)	140 (35.6)
1	44 (20.9)	35 (19.2)	79 (20.1)
2	31 (14.7)	29 (15.9)	60 (15.3)
3	15 (7.1)	20 (11.0)	35 (8.9)
4	11 (5.2)	15 (8.2)	26 (6.6)
5	6 (2.8)	12 (6.6)	18 (4.6)
6	2 (0.9)	10 (5.5)	12 (3.1)
7	4 (1.9)	6 (3.3)	10 (2.5)
8 or more	1 (0.5)	12 (6.6)	13 (3.3)
Total	211 (100.0)	182 (100.0)	393 (100.0)

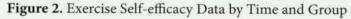
From: Increased Hatha yoga experience predicts lower body mass index and reduced medication use in women over 45 years, Moliver N, Mika E, Chartrand M, Burrus S, Haussmann R, Khalsa S, International Journal of Yoga, 4:77-86, 2011.

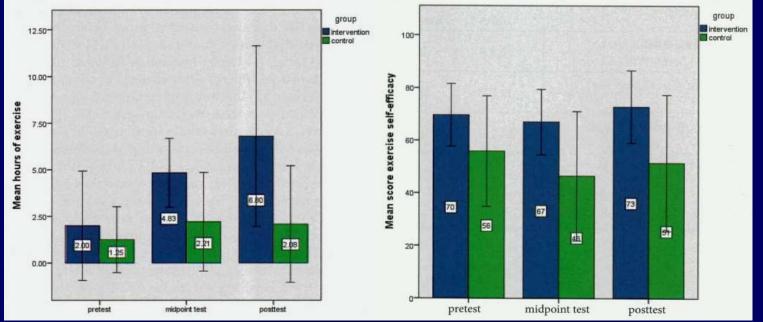
## Table 8: Types of medications used for conditions requiring medication

Medical condition	Yoga practitioners <sup>o</sup>	Non- practitioners <sup>b</sup>	Total	Z approx. <sup>c</sup>	
Anxiety	10 (4.7)	20 (11.0)	30 (7.6)	-2.32*	
Asthma	11 (5.2)	13 (7.1)	24 (6.1)	-0.80	
Blood thinning	2 (0.9)	8 (4.4)	10 (2.5)	-2.16*	
Bone density	19 (9.0)	18 (9.9)	37 (9.4)	-0.30	
Cancer	2 (0.9)	5 (2.7)	7 (1.8)	-1.34	
Depression	16 (7.6)	33 (18.1)	49 (12.5)	-3.15**	
Diabetes or prediabetes	4 (1.9)	28 (15.4)	32 (8.1)	-4.87***	
Digestion and elimination	11 (5.2)	17 (9.3)	28 (7.1)	-1.58	
High blood pressure	18 (8.5)	55 (30.2)	73 (18.6)	-5.51***	
High cholesterol	19 (9.0)	38 (20.9)	57 (14.5)	-3.33**	
High triglycerides	2 (0.9)	10 (5.5)	12 (3.1)	-2.61**	
Hot flashes	7 (3.3)	15 (8.2)	22 (5.6)	-2.12*	
Inflammation or arthritis	10 (4.7)	27 (14.8)	37 (9.4)	-3.41**	
Mood swings	2 (0.9)	3 (1.6)	5 (1.3)	-0.62	
Other medication	34 (16.1)	31 (17.0)	65 (16.5)	-0.24	
Other mood problems	3 (1.4)	0 (0.0)	3 (0.8)	-1.61	
Pain	15 (7.1)	38 (20.9)	53 (13.5)	-3.98***	
Sleep	10 (4.7)	15 (8.2)	25 (6.4)	-1.42	
Thyroid	33 (15.6)	36 (19.8)	60 (17.6)	-1.07	

## **Yoga for Exercise Adherence**

Figure 1. Exercise Adherence Data by Time and Group





"The acute-feeling responses to the yoga classes were favorable and may have been a key contributor to participants' improved perceptions of ability, which may have further fostered adherence." "The participants reported an increased self-awareness as a result of their experience."

From: The effects of yoga on psychosocial variables and exercise adherence: a randomized, controlled pilot study, Bryan S, Pinto Zipp G, Parasher R, Alternative Therapies in Health and Medicine, 18:50-9, 2012.



# Yoga Research by Institutes



VYASA Vivekananda Yoga Anusandhana Samsthana A Registered Charitable Society

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#### Research

Vivekanada Yoga Anusandana Samsthana (Vyasa), in collaboration with Swami Vivekananda Yoga Research Foundation (SVYASA), a recognized Scientific & Industrial Research Organization(SIRO) from the Department of Scientific & Industrial Research, Ministry of Science & Technology, Government of India, has published more than 200 research papers so far in the leading peer reviewed national and international journals. Added to this SVYASA is also equipped with a 200 bedded hospital ( yoga therapy ) serving s for the treatment of life style related ailments in the departments like Neurology,Spinal disorders,Metabolic disorders...etc.

#### **Research Facility**

The Swami Vivekananda Yoga Research Foundation was recognized as a Scientific & Industrial Research Organization(SIRO) from the Department of Scientific & Industrial Research. Ministry of Science & Technology, Government of India in the year 1988 as it was started following the path breaking work in evaluating the therapeutic use of yoga in the management of bronchial asthma [...]

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#### Conferences

Vivekanada Yoga Anusandaha Samsthaha (Vyasa), in concert with Swami Vivekananda Yoga Research Foundation (SVYASA), recognized Scientific & Industrial Research Organization(SIRO) conducts regulary national and international level conferences, independently and jointly with other medical and research institutes for promoting holistic living and thus help in achieving health and well being of the human kind.

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#### **Research Projects**

Vivekanada Yoga Anusandana Samsthana (Vyasa) jointly with Swami Vivekananda Yoga Research Foundation (SVYASA), recognized Scientific & Industrial Research Organization(SIRO), is constantly engaged in various research projects related to yoga, Neurology, Spinal and Metabolic disorders both at national and international level, independently and jointly in co8aboration with similar institutions like IISc, NIMHANS etc.

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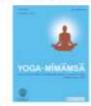
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#### Scientific Research Department

The leboratories in the department are equipped with modern scientific instruments to carry outfundamental and applied research work in Yage.

#### AIMS AND OBJECTIVES

- To investigate serious Yuga practices or insdem scientific lines by oung modern suplicitized suppresents and techniques employed in Physiology, Bio-chemistry, Psychology, Neuropsychology, Physical Education and adied dissiplines.
- Developing methods standardize the technique of various yogic practices on the basis of scientific investigation.
- To critically review the literature on Yopa in order understand yopic concepts available in related texts. for facilitating operatific investigation on Yopa.
- To callect the published scientific work an Yoga done in SR0 and elaewhere and to prepare consigrams, alisitracts and bibliographice on selected pogic practices.
- To project and deseminate the usertific information on Yoga through publication, participation in conferences and also by organizing seminars and workshops.
- To implement research findings and suggestions for updating the themestical and the practical training aspects in Yoge, imparted at G.S. College of Yoge and Cultural Synthesis as well as in the Yoge samps segarised by Kaiselyashama, in the light of the scientific researches in Yoge.
- To collaborate and co-ordinate with Philosophico-Literary Research Department and Yopic Hospital of our institute and also with other research institutions and agencies to facilitate generation and promotion of the sountific information relating to Yopa practices.

#### RECOGNITION5

- Scientific & Industrial Research Organization (SRO), the Organizment of Scientific & Industrial Research, Ministry of Science & Technology, Geneminant of Inde has accorded recognition to Keiselyadhama, since, 1988 as an Institute of Scientific Research.
- The institute has been recognized by the University of Pure, as a Research Centre from the year 1994. Looking at the research activities of the institute University of Pure has granted permanent recognition hum the year 2007.



## Advanced Centre for Yoga

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TheNational Institute of Mental Health and Neurosciences (NIMHANS), Bangalore, India, being a pioneer institute for psychiatric and neurological services, has been conducting research in Yoga since the early 1970's. Considering the popularity of Yoga, it was thought essential to establish an Advanced Yoga Therapy Centre in specialized fields of Medicine. Thus, the Advanced Centre for Yoga- Mental health and Neurosciences, a facility funded by the Ministry of Health, Govt. of India, was established at NIMHANS, Bangalore in November 2007. This centre was dedicated to Yoga promotion, training and research. The Advanced Centre provided service for patients and their caregivers suffering from psychiatric and neurological conditions, and also carried out pioneering research into the use of Yoga in neuropsychiatric conditions.

NIMHANS has now established the Integrated Centre for Yoga to carry on the work of the Advanced Centre. Situated in the AYUSH Block at NIMHANS, the centre has the capacity for conducting three batches of Yoga therapy sessions simultaneously. The central hall has a capacity to conduct Yoga sessions for for over 20 members. The centre is fully equipped with communication and research facilities. These facilities also aid in conducting regular academic programs in the centre.



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#### CYTER - CENTER FOR YOGA THERAPY, EDUCATION AND RESEARCH

#### **CYTER**

THE INVOLVATIVE ASPECTS OF CYTER FACULTY YOSA THEMAPY YOSA EDUCATION OUTBEACH PROGRAMMES CME's Publications	THE REPORTED AND STOLEN.	CALCULATE.	while furtherm	which a different is the line	A TRACK OF REAL PROPERTY.	-	The Average Street of Street
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"There are many centers where you can get a Yoga degree, attend a Yoga therapy semian or find Yoga research being undertaken. However, to have all three happening in one place is arely innovative. This center is indeed a role-model that combines the best of the East with that of the West,"-Joseph is Page, founder-Integrative Yoga Therapy, USA

ACCITER we have an integrated set up where we are aducating flature Yoga throughos, simultaneously Helping patients recover from threeses and at the same time developing enorderstanding through scientific revearch.

Whereas Trepa's usually found in departments of Physical Education & Sports in most universities, we at OTER have it in a medical institution thus enhancing the learning surver of ear manners as also enabling as to offer holistic therappoint terrefits for all patients in our hospital.





### PATANJALI RESEARCH FOUNDATION



#### Welcome to Patanjali Research Foundation

Patanjal Research Foundation was started in August 2010. This Research Foundation is a part of Patanjali Topporth and is located in Maridwar, in the north of India.

Patanjal Research Foundation (and indeed the parent body, Patanjali Yoggneth) are named after the great Indian sage, Patanjal (circa 900 B.C.) who first compiled the numerous writings on yoga in a way which is relevant and can be understand by people today.

#### The foundation aims at:

 Evaluating indigenous systems of medicine, particularly yogs and systems of medicine to physiological effects are studied using present-day scientific methods, with an aim of using these systems of medicine to promote health and manage disease.

 While the Poundation Targety uses actual scientific studies carried out in Taboratories, the aim would also be to review the ancient tests for contemporary reading.

Evaluating the use of home remedies through scientific studies so that these methods of healing may, if found suitable, be integrated in contemporary healing practices and hence be preserved.

4. Studying the scientific basis for ancient practices used in verious areas of life (e.g., farming and architecture) to that these ancient practices can be better understood and hence preserved.







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## Kripalu Institute for Extraordinary Living Changing the World Through Yoga Research

What if we were to make yoga widely available to schoolchildren and their teachers? To those who are sick as well as their caregivers?

Yoga has the potential to change our world—both through the alleviation of suffering and the creation of vast opportunities for self-fulfillment. Those of us who practice yoga know this is true. But in order to imbue the transformational effects of yoga deeply into our society, we must combine the gifts of yoga with scientific validation. This is what the IEL is doing!

Did you know that the IEL is developing and rigorously evaluating yoga-based programs to transform schools and health care? Teams of Kripalu vogis and leading scientists are joining together to make the case that yoga can transform our world and build the programs to make it happen.

Please find out more about our work by reviewing the information throughout this website. If you can, we urge you to make a donation (at right) to support one of our projects. You can bring the gift of yoga to schoolchildren and to so many others who might not otherwise have access to yoga.



## Okay,

your posture's very good. Now, relax, concentrate, and slowly let go of your cell phone. Kripalu Yoga Research

- 33 published research studies from 1985 to 2015
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- Greater widespread functional connectivity of the caudate in older adults who practice kripalu yoga and vipassana meditation than in controls, Gard T, Taquet M, Dixit R, Hölzel BK, Dickerson BC, Lazar SW, Front Hum Neurosci. 2015 Mar 16;9:137.
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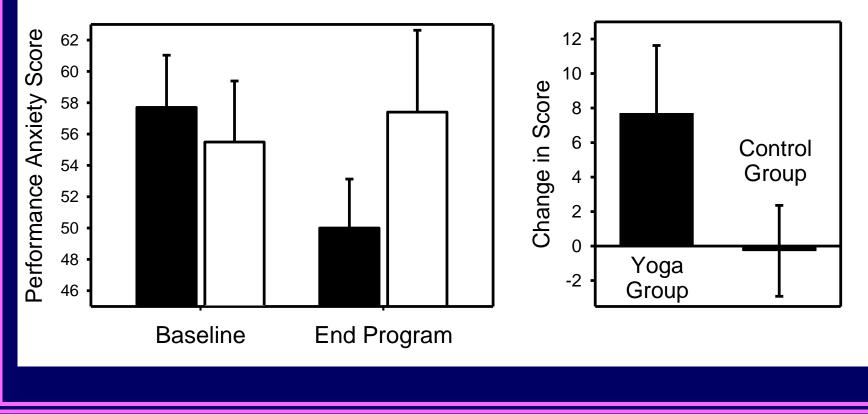
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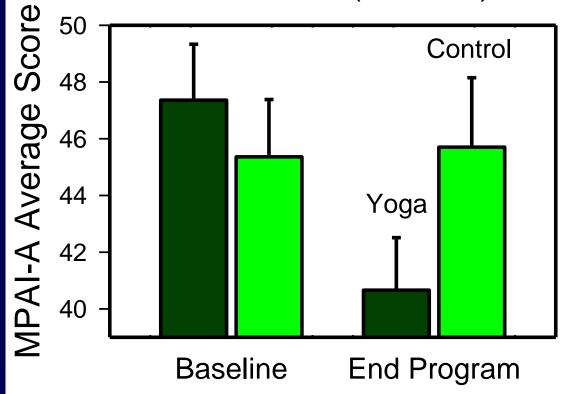
## **Performance Anxiety**





## Kripalu Yoga for Performance Anxiety

Music Performance Anxiety Inventory for Adolescents (MPAI-A)



From: Yoga Reduces Performance Anxiety in Adolescent Musicians, Khalsa SBS, Butzer B, Shorter SM, Reinhardt K., Cope S, under review.

# Kripalu Yoga for Performance Anxiety

#### Articles

#### A Yoga Intervention for Music Performance Anxiety in Conservatory Students

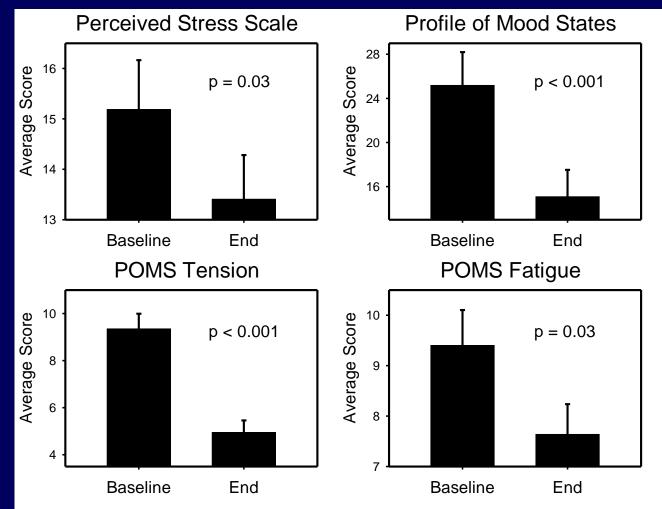
Judith R.S. Stern, PhD, JD, Sat Bir S. Khalsa, PhD, and Stefan G. Hofmann, PhD

Music performance anxiety can adversely affect musicians. There is a need for additional treatment strategies, especially those that might be more acceptable to musicians than existing therapies. This pilot study examined the effectiveness of a 9-week voga practice on reducing music performance anxiety in undergraduate and graduate music conservatory students, including both vocalists and instrumentalists. The intervention consisted of fourteen 60-minute yoga classes approximately twice a week and a brief daily home practice. Of the 24 students enrolled in the study, 17 attended the post-intervention assessment. Participants who completed the measures at both pre- and post-intervention assessments showed large decreases in music performance anxiety as well as in trait anxiety. Improvements were sustained at 7- to 14-month follow-up. Participants generally provided positive comments about the program and its benefits. This study suggests that yoga is a promising intervention for music performance anxiety in conservatory students and therefore warrants further research. Med Probl Perform Art 2012; 27(3): 123-128.

blockers appear to reduce somatic symptoms of MPA while improving some aspects of performance quality.<sup>4</sup> Other methods of treating MPA that show promise include cognitive-behavioral therapy. Some mind-body interventions, including meditation, have been assessed in a few small studies each.<sup>5</sup> Most musicians with MPA, however, do not avail themselves of psychotherapy.<sup>6</sup> In a 1986 survey of 2,212 orchestral musicians by the International Conference of Symphony and Opera Musicians (ICSOM), only 25% of musicians suffering from severe stage fright reported trying psychological counseling.<sup>7</sup>

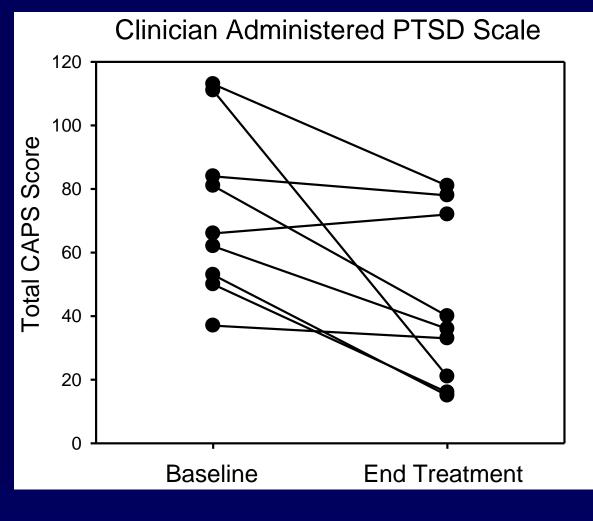
Yoga, a holistic mind-body practice that includes cognitive (meditation) and somatic (physical postures and breathing exercises) elements, has been described as an "attractive therapeutic option" for anxiety and anxiety disorders, especially for people who reject conventional psychological treat-

## **Stress / Mood in Police Academy Recruits**

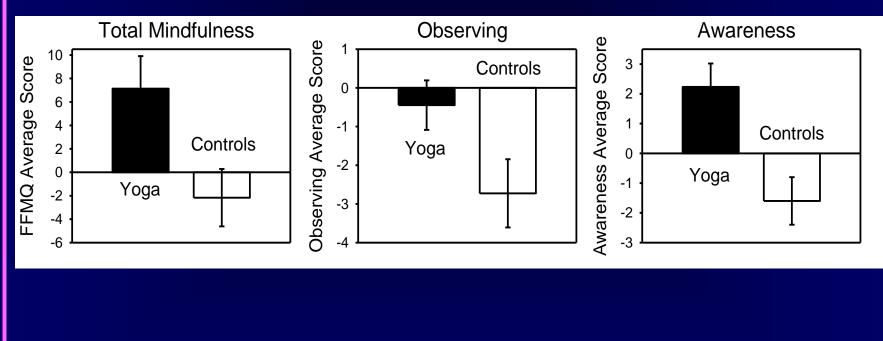


From: A Kripalu yoga intervention in police academy recruits, Khalsa SBS, Morgan L, Cronin S, Unpublished data.

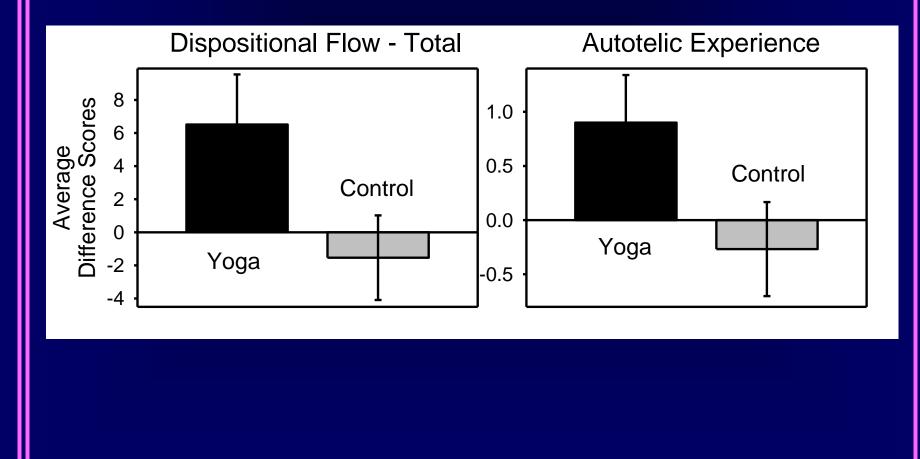
# **Yoga for PTSD**



# Positive Psychological Changes in Musicians with Kripalu Yoga



# Positive Psychological Changes in Musicians with Kripalu Yoga





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#### **Evaluation of the Mental Health Benefits of Yoga in a Secondary School: A Preliminary Randomized Controlled Trial**

Sat Bir S. Khalsa, PhD Lynn Hickey-Schultz, EdD Deborah Cohen, MEd Naomi Steiner, MD Stephen Cope, MSW

80

The Journal of Behavioral Health Services & Research 39:1 January 2012

**Original Article** 

#### Benefits of Yoga for Psychosocial Well-Being in a US High School Curriculum: A Preliminary Randomized Controlled Trial

Jessica J. Noggle, PhD,\* Naomi J. Steiner, MD,† Takuya Minami, PhD,‡ Sat Bir S. Khalsa, PhD\*

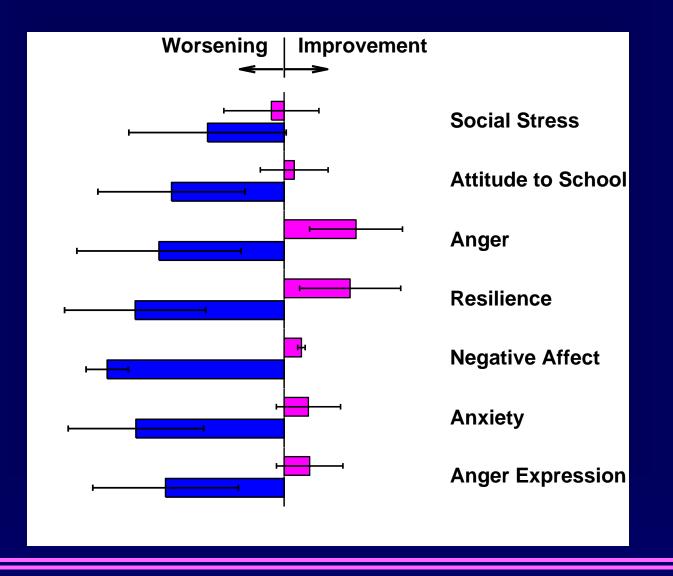
Vol. 33, No. 3, April 2012

# Yoga in Public School Research

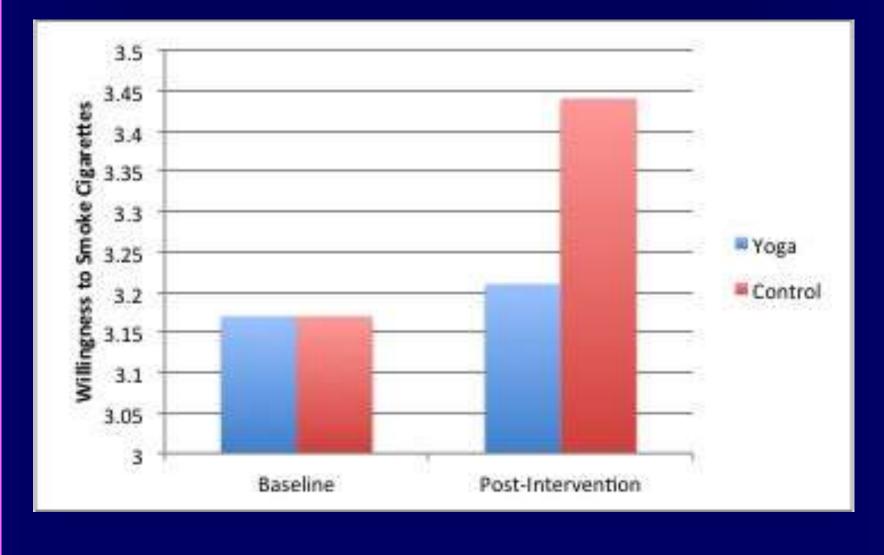
- 12-week 1-hr Yoga Ed/Kripalu classes 2-3 times/week
- RCT, yoga vs. physical education, N ~ 100
- Qualitative interviews post-program
- Self-report pre-post mental health questionnaires



### **Mental Health Outcomes**



## **Mental Health Outcomes**



#### ORIGINAL RESEARCH

# QUALITATIVE EVALUATION OF A HIGH SCHOOL YOGA PROGRAM: FEASIBILITY AND PERCEIVED BENEFITS

Lisa A. Conboy, MA, MS, ScD,<sup>1#</sup> Jessica J. Noggle, PhD,<sup>2</sup> Jessica L. Frey, BA,<sup>3</sup> Ravi S. Kudesia, BA,<sup>4</sup> and Sat Bir S. Khalsa, PhD<sup>2</sup>

This is the first published qualitative assessment of a yoga program applied in a high school setting. This qualitative interview study was nested in a randomized, controlled trial studying the effects of a yoga program offered in place of a semester of physical education classes at a rural public high school. Student interviews were conducted after taking part in a semester of the yoga program. A formal passive consent with information about the qualitative study was sent home to parents/guardians of all students in the parent study before the interviews. Most students enjoyed the yoga classes and felt benefits. Negative reports of yoga practice were associated with gender as most males sensed peer pressure against practicing yoga. Despite this finding, most students wanted to continue yoga and would continue if it were offered in school. Positive reports include a greater kinesthetic awareness, which some students associated with a greater respect for the body and improved self-image. Among students reporting psychological benefits, many cited stress reduction; many used yoga to manage negative emotions; and some propagated more optimism. Most thought yoga could reduce interest in the use of drugs and alcohol and increase social cohesion with family and peers. We found that a yoga program is feasible in this sample of 9th and 10th graders, especially after benefits are perceived. We also found evidence that yoga may lead to emergent positive benefits in health behaviors not directly prescribed by the program. These results suggest that school-based yoga programs may be appropriate for promoting healthy behaviors at a societal level by focusing on the prevention of negative patterns during the adolescent transition.

Key words: Yoga, high school, qualitative, complementary medicine, adolescent

(Explore 2013; 9:171-180. © 2013 Elsevier Inc. All rights reserved.)

## **Stress**

- "Before you're taking a test... relax and breathe and you don't get as nervous or as tense."
- "I used breathing outside the classroom in my life to calm me down... if I was stressed or angry I would then do the breathing to calm me down and I will probably continue to do this...I was less anxious about school in general..."
- "Yoga definitely helped with sleeping ... it would take me a long time to get to sleep. When I was doing yoga it was much easier to fall asleep and stay asleep."
- "My friends would complain before and after [class] so there was a lot of peer pressure to not like yoga but it made me more calm... I like it but you know, a bunch of my friends are peer pressuring and stuff ... they are like 'yoga sucks' and all that stuff. I'm like 'oh I feel relaxed' and they are like dude how can you feel relaxed?"

From: Qualitative evaluation of a high school yoga program: Feasibility and perceived benefits, Conboy LA, Noggle JJ, Frey JL, Kudesia RS, Khalsa SBS, Explore: The Journal of Science & Healing, 9:171-180, 2013.

#### Awareness

- "I learned how to pay attention to how my body feels..."
- "Respecting how my body works ... the poses helped with gaining control over myself ... yoga gave me a new perspective on my body and I have more control than I thought I did."
- "I was motivated and inspired to practice yoga outside of class at home. It was great to have a form of exercise I found enjoyable and that felt good. I noticed myself changing: an increase in self awareness and it felt like instant gratification."
- "I have been eating healthier, more fruits and vegetables and not a lot of junk food; [for example] ice cream and candy..."

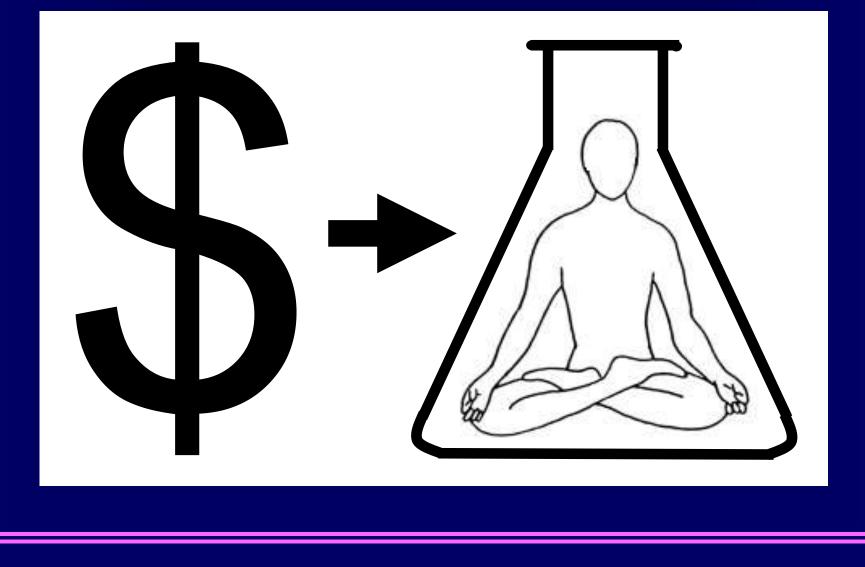
From: Qualitative evaluation of a high school yoga program: Feasibility and perceived benefits, Conboy LA, Noggle JJ, Frey JL, Kudesia RS, Khalsa SBS, Explore: The Journal of Science & Healing, 9:171-180, 2013.

# **Transformation**

- "I am fascinated by the culture of yoga, how people can change their lives and help themselves physically, emotionally ... I am interested in learning more."
- "I have been a lot more happier lately ... I feel like a better person, making better choices, and staying out of trouble."
- I definitely benefited from yoga classes. ... I also have a poor ethic doing something on a regular basis so yoga classes helped with dedication.
- "It (yoga) has made a huge impact on our school...It is making our school a better place."

From: Qualitative evaluation of a high school yoga program: Feasibility and perceived benefits, Conboy LA, Noggle JJ, Frey JL, Kudesia RS, Khalsa SBS, Explore: The Journal of Science & Healing, 9:171-180, 2013.

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### **Future Directions**

- New Disorders
- Neuroimaging
- Genomic Expression
- Specificity of Practices
- Positive Psychology

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#### Kripalu Institute for Extraordinary Living Changing the World Through Yoga Research

What if we were to make yoga widely available to schoolchildren and their teachers? To those who are sick as well as their caregivers?

Yoga has the potential to change our world—both through the alleviation of suffering and the creation of vast opportunities for self-fulfillment. Those of us who practice yoga know this is true. But in order to imbue the transformational effects of yoga deeply into our society, we must combine the gifts of yoga with scientific validation. This is what the IEL is doing!

Did you know that the IEL is developing and rigorously evaluating yoga-based programs to transform schools and health care? Teams of Kripalu vogis and leading scientists are joining together to make the case that yoga can transform our world and build the programs to make it happen.

Please find out more about our work by reviewing the information throughout this website. If you can, we urge you to make a donation (at right) to support one of our projects. You can bring the gift of yoga to schoolchildren and to so many others who might not otherwise have access to yoga.

#### TATR CELEMEDICINE & ADVANCED TECHNOLOGY RESEARCH CENTER

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#### **RESEARCH HIGHLIGHTS**

Dr. Khalsa and the ARPF were the first to recommend an integrative or holistic program for building a healthier, stronger brain, thus slowing the development of cognitive decline. Since then, the ARPF's 4 Pillars of Alzheimer's Prevention have been incorporated by other Alzheimer's groups and this concept is now considered mainstream. Indeed, the ARPF is now partnering with the FINGER study (Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability), the largest study in history on Alzheimer's prevention.



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#### About The Kundalini Research Institute

Established on February 1, 1972 by Yogi Bhajan, Ph.D., Master of Kundalini Yoga, the Kundalini Research Institute is entrusted with The Teachings of Yogi Bhajan, KRI, a non-profit corporation, safeguards the purity, integrity, and accuracy of the Teachings of Yogi Bhajan by:

- Developing 3 levels of International Yoga Teacher Certification
- Preserving the teachings legacy for the future online Library of the Teachings
- Awarding the KRI Seal of Approval to products that successfully meet the standards of KRI Review
- Providing services and resources for Kundalini Yoga students and teachers via online services and upgraded Yogi Bhajan Products

Kundalini Yoga, the Yoga of Awareness, was brought to the West by Yogi Bhajan in 1968. Yogi Bhajan taught that, through the practice of Kundalini Yoga and meditation, your glandular and nervous systems are stimulated, and your capacity for creative potential is heightened. You gain inner vitality to compensate for the adverse effects of stress so you can excel in life.

Kundalini yoga classes are a dynamic blend of postures, pranayam, mantra, music and meditation, which teach you the art of relaxation, self-healing and elevation. Balancing body and mind enables you to experience the clarity and beauty of your soul. No previous experience in yoga is required for you to achieve results with your very first class.



