Introduction

October 16, 2017
Yoga Research 101:
The Basics of Yoga Research
for Therapists, Instructors, and New Investigators
IAYT Symposium on Yoga Research

Sat Bir S. Khalsa, Ph.D.
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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
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Kim Innes, PhD
Associate Professor, Department of Epidemiology, West Virginia University

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Instructor in Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, The New England School of Acupuncture at MCPHS University
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The State of the Field of Yoga Therapy Research

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Yoga Alliance/Yoga Journal Survey 2016

Practicing = 36.7 M
Likely to try = 83.3 M

From: http://www.yogajournal.com/yogainamericastudy/
Yoga Alliance/Yoga Journal Survey 2016

Yoga Practitioners
(in millions)

From: http://www.yogajournal.com/yogainamericastudy/
How does yoga reduce stress? A systematic review of mechanisms
of change and guide to future inquiry
Kristen E. Riley* and Crystal L. Park

Neurophysiological and
neurocognitive mechanisms
underlying the effects of yoga-based
practices: towards a comprehensive
theoretical framework
Laura Schmalzl1,2,*, Chivon Powers3 and Eva Henje Blom4,5

1 Department of Family Medicine and Public Health, School of Medicine, University of California San Diego, La Jolla, CA, USA, 2 VA San Diego Healthcare System, La Jolla, CA, USA, 3 Center for Mind and Brain, University of California Davis, Davis, CA, USA, 4 Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden, 5 Department of Psychiatry, University of California San Francisco, San Francisco, CA, USA

Potential self-regulatory mechanisms of yoga for
psychological health
Tim Gard1,2,3†, Jessica J. Noggle4†, Crystal L. Park5†, David R. Vago6 † and Angela Wilson7 †
CHAPTER FOUR
RESEARCH ON THE PSYCHOPHYSIOLOGY OF YOGA
L SCHMALZL • CC STREETER • SBS KHALSA

Introduction
Yoga as a multicomponent practice
Yoga-based practices are inherently multifaceted in nature. In modern contexts, they typically involve a combination of specific postures or movement sequences, breath regulation, deep relaxation, and meditative techniques (Gard et al., 2014b). There are numerous “styles” of yoga-based practices representing various schools and lineages of yoga. Most of them differ in terms of the relative emphasis that is put on each of the main components as well as how these components are taught, which in turn impacts their psychophysiological effects. This chapter will outline what is currently known about the psychophysiology of the main components of yoga-based practices, and how they work in concert, primarily based on basic research studies (i.e., psychophysiology research on healthy populations).

History of basic psychophysiological research on yoga
Basic research on yoga-based practices began in the early twentieth century with the work of Swami Kuvalayananda, founder of the Kaivalyadhama Research Institute and the first yoga research journal, Yoga Mimamsa, which was launched in 1924. Kuvalayananda and colleagues conducted dozens of studies on individual yoga practices, which were published in their journal over the next four decades. Many of the early studies focused on investigating the effects of individual physical or respiratory practices with the use of X-rays and measures of air pressure, O₂, and CO₂ levels, acid/base balance, and blood pressure. For Western scientists, interest in the psychophysiology of yoga was likely inspired by the reports of remarkable feats of expert yoga practitioners, such as the ability to slow/stop heart rate and to reduce metabolism sufficiently to survive in airtight enclosures. These led to observational studies and subsequently published reports in the 1950s and 1960s, which affirmed the ability of these practitioners to self-regulate internal psychophysiological processes including heart rate, respiration, metabolism, and autonomic nervous system functioning (Wenger & Bagchi, 1961).

Psychophysiology of yoga postures and movement sequences
Characteristics of yoga postures and movement sequences
Modern yoga-based practices typically have a strong emphasis on postures and movement sequences (Singleton, 2010). In fact, particularly in the West, there are yoga practice styles consisting solely of posture or movement sequences that exist alongside more traditional multicomponent contemplative yoga practice styles. Yoga postures and movements can range from large and overt to small and subtle and may even include purely internal or imagined motion (Schmalzl, Crane-Godreau, & Payne, 2014). Some types of practices involve dynamic and continuous physical movement with a focus on creating a “flow” by linking one posture to the next (Jois, 1999), some are more static with individual postures being held for a longer period of time (Iyengar, 1966), and some employ a combination of flowing movement sequences and static postures.

There are innumerable individual yoga postures and variations thereof, which are typically aimed at increasing range of motion, strength, endurance, flexibility, and balance, as well as promoting relaxation and well-being. In broad terms, yoga postures can be divided into categories including standing postures, seated postures, supine postures, forward bends, backbends, lateral bends of the spine, twists, hip-openers, and inversions. Postures are
Regulation and Gene Expression

Gene on DNA

Primary transcript

mRNA

NUCLEUS

CYTOSOL

Protein

transcriptional control

RNA processing control

RNA transport control

translation control
“...the effects of Kirtan Kriya suppressing expression of inflammation-related genes and up-regulating expression of genes involved in antiviral and immunoglobulin responses ...”
Yoga and Brain Structure—Neuroplasticity

...more weekly regular yoga practice is associated with larger brain volume in areas involved in bodily representation, attention, self-relevant processing, visualization, and stress regulation.

Yoga Practices
Postures, Breathing, Relaxation, Meditation

Fitness
- ↑Flexibility
- ↑Strength
- ↑Coordination/Balance
- ↑Respiratory Function
- ↑Self-Efficacy

Self-Regulation
- ↑Emotion Regulation
- ↑Stress Regulation
- ↑Resilience
- ↑Equanimity
- ↑Self-Efficacy

Awareness
- ↑Attention
- ↑Mindfulness
- ↑Concentration
- ↑Cognition
- ↑Meta-cognition

Spirituality
- ↑Transcendence
- ↑Unitive State
- ↑Flow
- ↑Transformation
- ↑Life Meaning/Purpose

Global Human Functionality
- ↑Physical & Mental Health
- ↑Physical, Mental, Emotional Performance
- ↑Positive Behavior Change
- ↑Social Responsibility, Values, Relationships
- ↑Quality of Life
- ↑Life Purpose & Meaning
- ↑Spirituality
Effects of Yoga on Mental and Physical Health: A Short Summary of Reviews

Arndt Büssing, Andreas Michalsen, Sat Bir S. Khalsa, Shirley Telles, and Karen J. Sherman

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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.
SYR 2017
October 16 - 18, 2017
Kripalu Center for Yoga & Health

SYR is the West's foremost academic yoga research conference. SYR showcases some of the best new research and offers multiple poster sessions as well as ample opportunities to interact with other scientists, experts and professionals in the field. SYR 2017 will be held at the Kripalu Center for Yoga & Health in the beautiful Berkshires in western Massachusetts.
The Principles and Practice of Yoga in Health Care

This is the first book for physicians, yoga researchers, yoga therapists, nurses, and other health care professionals that systematically and comprehensively presents the biomedical research on the efficacy of yoga in health care, describes the implications of this evidence, and provides practical application recommendations.

This book:
• brings together the science and the practice of yoga therapy
• reviews the scientific evidence base for yoga for a wide variety of medical conditions
• comprehensively summarizes research findings and their practical implications for professionals who use yoga or refer patients for yoga practice
• includes chapter contributions by leading biomedical researchers of yoga
• supports the emergence of yoga therapy as a credible profession
• provides brief contributions by expert yoga therapists describing practical implementation issues relevant to yoga for specific conditions

The Principles and Practice of Yoga in Health Care will prove essential to yoga therapists, physical therapists, physicians, psychologists and other health professionals interested in yoga as a therapeutic intervention.

Sat Bir Singh Khalsa, PhD, is currently an Assistant Professor of Medicine at Brigham and Women’s Hospital, Harvard Medical School, Director of Research for the Kundalini Research Institute, Research Director for the Kripalu Center for Yoga & Health, and Research Associate at the Bonsen-Henry Institute for Mind Body Medicine. He serves with the International Association of Yoga Therapists as scientific coordinator for the annual Symposium on Yoga Research and editor-in-chief of the International Journal of Yoga Therapy.

Lorenzo Cohen, PhD, is Richard E. Huene Distinguished Professor in Clinical Care Prevention, Director of the Integrative Medicine Program, and Chief, Section of Integrative Medicine, Department of Palliative, Rehabilitation, and Integrative Medicine at the University of Texas MD Anderson Cancer Center. He is also Distinguished Clinical Professor, Fudan University Cancer Hospital, Shanghai, China. Dr. Cohen is a founding member and past president of the International Society for Integrative Oncology.

Timothy McCall, MD, is a board-certified internist and the author of two books, Examining Your Doctor: A Patient’s Guide to Avoiding Harmful Medical Care (Street Press) and Yoga and Medicine: The Yoga Prescription for Health and Healing (Shambhala Books). He teaches yoga therapy seminars and teaches trainings worldwide. He co-directs a yoga therapy center and has been the medical editor of Yoga Journal since 2002.

Shirley Telles, MBA, MPH, PhD, has been awarded the first ever Indian (Academy of Medical Research Center for Advanced Research in Bangalore. Since 2007, she has been the Director of the Patanjali Research Foundation in Haridwar, India, which is committed to researching the effects of yoga and ayurveda. Dr. Telles has 159 publications indexed in bibliographic databases, is a first or main author on most of these. Her 17 chapters in books and has written 3 books.

Forewords by
D Ornish, MD • BM Hegde, MD, PhD, FRCP

• 23 chapters with theory, rationale, research & practice
• ~60 chapter contributors, ~30 yoga therapist contributors
Announcing Sat Bir Khalsa, PhD and Laura Schmalzl, PhD as New Editors for the IJYT!

Wednesday, April 15, 2015  (0 Comments)
Posted by: John Kepner

We are pleased and proud to announce Sat Bir Khalsa, PhD, as Editor in Chief of the International Journal of Yoga Therapy and Laura Schmalzl, PhD, RYT, as our new Managing Editor. Will Boggs, MD, will return to the Editorial Board.

Sat Bir brings an unparalleled reputation in the international yoga research community. He has also served as Chair of IAYT’s Scientific Program Committee since SYTAR 2008. Dr. Khalsa has grown that position enormously for the Symposium on Yoga Research since 2010.

Laura has a remarkable international background, holding research positions in Australia and Sweden, before her current position at UC-San Diego. She is also an Associate Editor for Frontiers in Human Neuroscience and speaks five languages.

For more background on both editors, see their bios on the IAYT Management page.
Yoga Research Journals

- Yoga Mimamsa (1924)
- International Journal of Yoga Therapy (1990)
- Journal of Yoga and Physical Therapy (2011)
- International Scientific Yoga Journal SENSE (2011)
- International Journal of Yoga and Allied Sciences (2012)
- Journal of Advanced Research in Ayurveda, Yoga, Unani, Siddha and Homeopathy (2014)
- Journal of Yoga and Physiotherapy (2016)
- International Journal of Advanced Ayurveda, Yoga, Unani, Siddha and Homeopathy (2016)
- International Journal of Yoga, Physiotherapy and Physical Education (2016)
- MOJ Yoga & Physical Therapy (2016)
- International Journal of Yoga Natural Therapy (newly founded)
Advancing integrative medicine and health through academic institutions and health systems.

WHO WE ARE

We've changed our name! The Consortium of Academic Health Centers for Integrative Medicine is now the Academic Consortium for Integrative Medicine & Health (The Consortium)

As an organization we are committed to sharing information and ideas, meeting challenges together in a process grounded by the values of integrative medicine, supporting member institutions, and providing a national voice for the advancement of integrative principles.

WHAT WE DO

The mission of the Consortium is to advance integrative medicine and health through academic institutions and health systems.

PIONEERING. VISIONARY. INTEGRATIVE.
Figure 2 Year of publication. Numbers of publications between 1975 (year of first published RCT) and 2013 (last year completely covered by the literature search).

Figure 3 Origin of RCTs. Number of RCTs (not publications) classified according to country in descending order. Others = countries with just 1 RCT.

Chronology of Yoga Therapy RCT’s

Yoga as a Therapeutic Intervention: A Bibliometric Analysis of Published Research Studies from 1967 to 2013

Pamela E. Jeter, PhD, Jeremiah Slutsky, BS, Nilkamal Singh, MSc, and Sat Bir S. Khalsa, PhD

Abstract

Objective: A comprehensive bibliometric analysis was conducted on publications for yoga therapy research in clinical populations.

Methods: Major electronic databases were searched for articles in all languages published between 1967 and 2013. Databases included PubMed, PsychInfo, MEDLINE, IndMed, Indian Citation Index, Index Medicus for South-East Asia Region, Web of Knowledge, Embase, EBSCO, and Google Scholar. Nonindexed journals were searched manually. Key search words included yoga, yoga therapy, pranayama, asana. All studies met the definition of a clinical trial. All styles of yoga were included. The authors extracted the data.

Results: A total of 486 articles met the inclusion criteria and were published in 217 different peer-reviewed journals from 29 different countries on 28,080 study participants. The primary result observed is the three-fold increase in number of publications seen in the last 10 years, inclusive of all study designs. Overall, 45% of the studies published were randomized controlled trials, 18% were controlled studies, and 37% were uncontrolled studies. Most publications originated from India (n = 258), followed by the United States (n = 122) and Canada (n = 13). The top three disorders addressed by yoga interventions were mental health, cardiovascular disease, and respiratory disease.

Conclusion: A surge in publications on yoga to mitigate disease-related symptoms in clinical populations has occurred despite challenges facing the field of yoga research, which include standardization and limitations in funding, time, and resources. The population at large has observed a parallel surge in the use of yoga outside of clinical practice. The use of yoga as a complementary therapy in clinical practice may lead to health benefits beyond traditional treatment alone; however, to effect changes in health care policy, more high-quality, evidence-based research is needed.
Chronology of Yoga Therapy Research

Chronology of Yoga Therapy Research

Yoga Therapy Research Design

Yoga Therapy Publication Sources

Yoga Therapy Research Quality

Study Design by Journal Type (n = 460*)

- RCTs
- Controlled
- Uncontrolled

Yoga Therapy Research Quality

Control Conditions Yoga RCT's

Figure 6 Control interventions. Number of RCTs classified according to control intervention. Others = control interventions that were used in just 1 RCT.

Published Analyses of Yoga Research


Are Indian yoga trials more likely to be positive than those from other countries? A systematic review of randomized controlled trials, Cramer H, Lauche R, Langhorst J, Dobos G., Contemp Clin Trials. 2015;41:269-72.


Comparison groups in yoga research: a systematic review and critical evaluation of the literature.


What does NCCIH do? ➤
We conduct and support research and provide information about complementary health products and practices.

News ➤
- NIH complementary and integrative health agency gets new name (12/17/14)
- Advisory Council 54th Meeting Agenda—February 6, 2015
- Message From the Director: NCCAM Has a New Name! (01/16/15)
- Drs. Jerome Groopman and Pamela Hartzband to speak at NIH on medical decision making NCCIH presents "When Experts Disagree: The Art of Medical Decision Making" (01/15/15)
- Message From the Director: Beware of "Alternative" Claims for Ebola (09/11/14)
Serving the Yoga Community

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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-fulfilment. 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 yogis 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.
"I’m one of those scientists that studies things that pretty much everyone already knows."