

# Yoga for AYA Cancer Survivors: Myriad Mechanisms and Effects



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# Clinical Trials in Cancer Patients and Survivors



- Depression
- Anxiety and stress
- Fatigue
- PTSD
- Global side effects, lymphedema
- Spiritual well-being
- Quality of life
- Sleep quality
- Salivary cortisol
- Radiation-induced DNA damage
- Post-chemotherapy-induced nausea
- Lymphocyte apoptosis



# State of the Science for Yoga as Adjunct Tx



- Preliminary results are promising
- Research remains inconclusive
  - Lack of strong control conditions
  - Lack of strong methodology
  - Lack of follow-up

# State of the Science for Yoga as Adjunct Tx for AYAs



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The impact of Yoga upon young adult cancer survivors

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- 292 survivors, mean age = 33.3 years
- Mean age at diagnosis = 29.5
- Mean time since diagnosis = 4.08 years ( $SD = 3.26$ , range = 0–16)
- 80% women; 92% identified as Caucasian/White

# Do AYAs practice yoga on their own?



- 32% reported that they had participated in yoga for health reasons since their diagnosis
- Of these, 22% reported that it was a special yoga for cancer survivors
- Among those who reported having participated in yoga since their diagnosis
  - Mean amount of yoga was 7.46 h/month
  - Mean length of time practicing yoga was 25.88 months
  - Mean yoga dose (total amount of yoga use since cancer diagnosis) was 189.22 hours (median = 52.00 hours)

# What characterizes AYA yoga practitioners?



- Gender
- Higher age (not for “ever in survivorship” but for “dose”)
- Income (not for “ever” but for “dose”)
- Education (for “ever” but not for “dose”)
- No race/ethnicity or cancer-related variables

# Why do survivors select yoga?



- Flexibility (96.7%)
- Relaxation (94.5%)
- Peace (81.3%),
- Happiness (68.1%)
- Depression/anxiety relief (56%)
- Spirituality (45.1%)
- Pain relief (42.9%)
- Weight control (42.9%)
- Control of side effects (27.5%)



# How is yoga related to well-being?



- Compared survivors who participated in yoga since dx versus not
  - QLI family satisfaction
  - SF-36 MCS
- Correlation of yoga dose
  - SF-36 MCS
  - QLI family satisfaction
  - Positive states of mind

# State of the Science for Yoga as Adjunct Tx for AYAs



- Lillian Sung and colleagues: pediatric onc
- Orsey, Park, Pulaski, Shankar, Popp, & Wakefield, 2017

## **Results of a Pilot Yoga Intervention to Improve Pediatric Cancer Patients' Quality of Life and Physical Activity and Parents' Well-being**

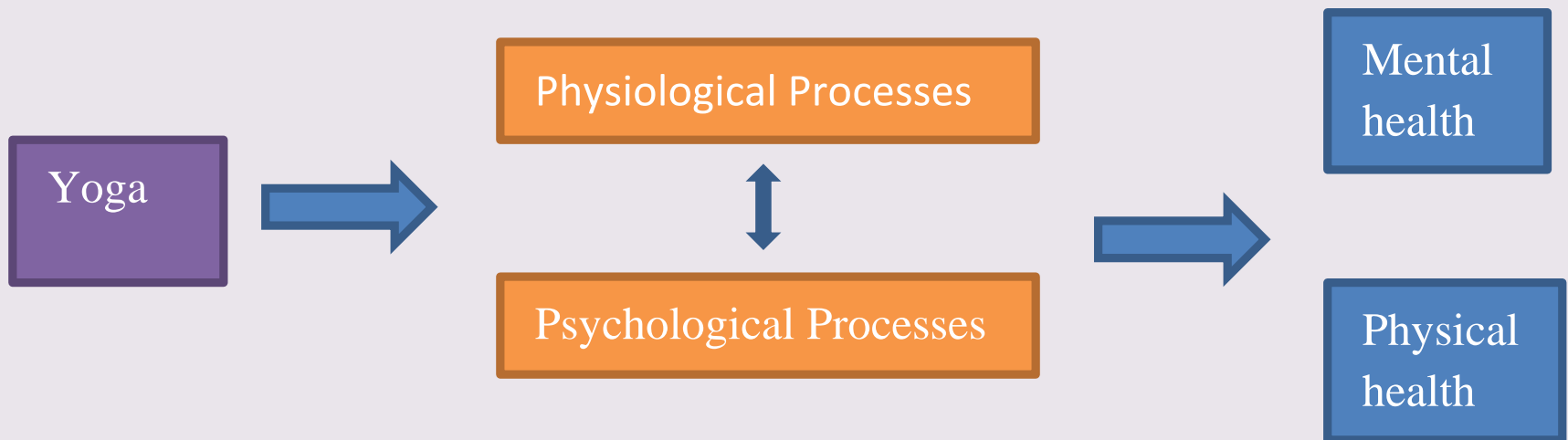
*Andrea D. Orsey, MD, MSCE<sup>1,2</sup>; Crystal L. Park, PhD<sup>3</sup>; Regan Pulaski, BS<sup>4</sup>; Nilani L. Shankar, MA<sup>5</sup>; Jill M. Popp, PhD<sup>6</sup>;  
Dorothy Wakefield, MS<sup>7</sup>*

# State of the Science for Yoga as Adjunct Tx for AYAs



- Good match for many identified needs of AYAs
  - Physical benefits
  - Social benefits
  - Emotional benefits
  - Mental benefits
  - Spiritual benefits
- Inpatient, outpatient, longer-term survivorship
- Generally reasonably fit
- Scalable, disseminable, available at home, via web, in community

# How does yoga work?



# Physiological pathways



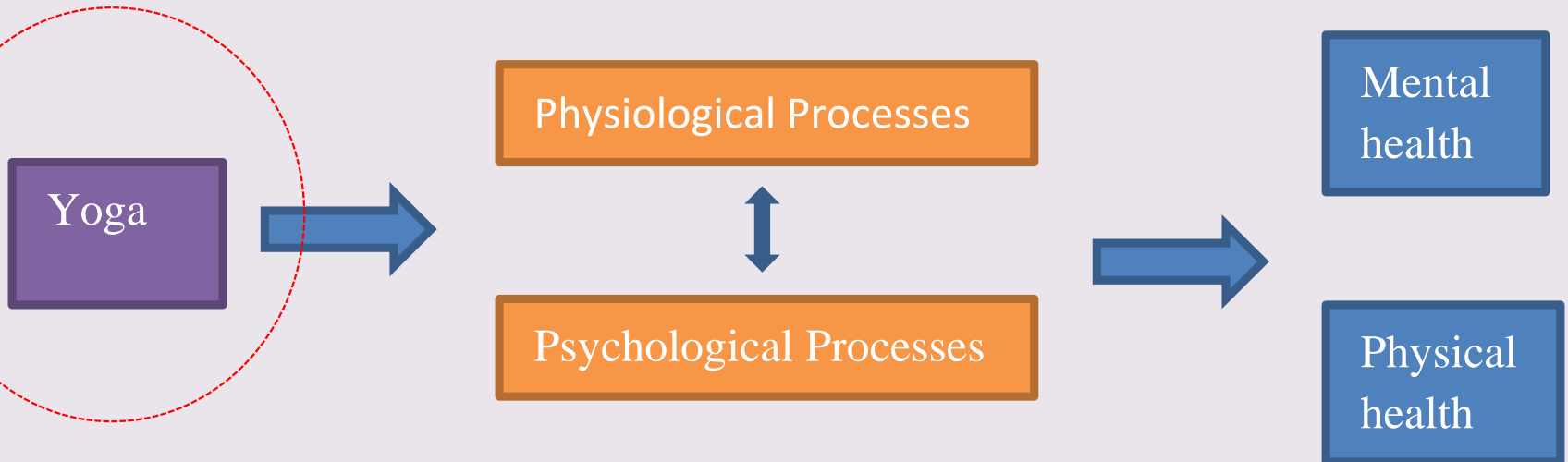
- Dampened stress response via down-regulation of the hypothalamic– pituitary–adrenal (HPA) axis and the sympathetic nervous system.
  - Decreased salivary cortisol
  - Increased GABA
  - Decreased heart rate and systolic and diastolic blood pressure
- Improved immune functioning
  - increased levels of immunoglobulin A12, natural killer cells
- Decreased inflammation (CRP, IL-6)
- Improved strength and flexibility
- Epigenetics

# Psychological pathways



- Reduced stress, depression, and anxiety
- Reduced emotional reactivity
- Improved body image
- Improved vigor and energy
- Increased self-confidence
- Increased self-compassion
- Increased positive affect and happiness
- Increased mastery & self-efficacy
- Better health behaviors (sleep, diet)
- Better self-regulation

# Yoga remains a “black box”



# Many Varieties of Hatha Yoga



- Anusara
- Ashtanga
- Bikram
- Baptiste Power
- Forest
- Kripalu
- Kundalini
- Vinyasa
- Yin



# Some of the differences between types of yoga



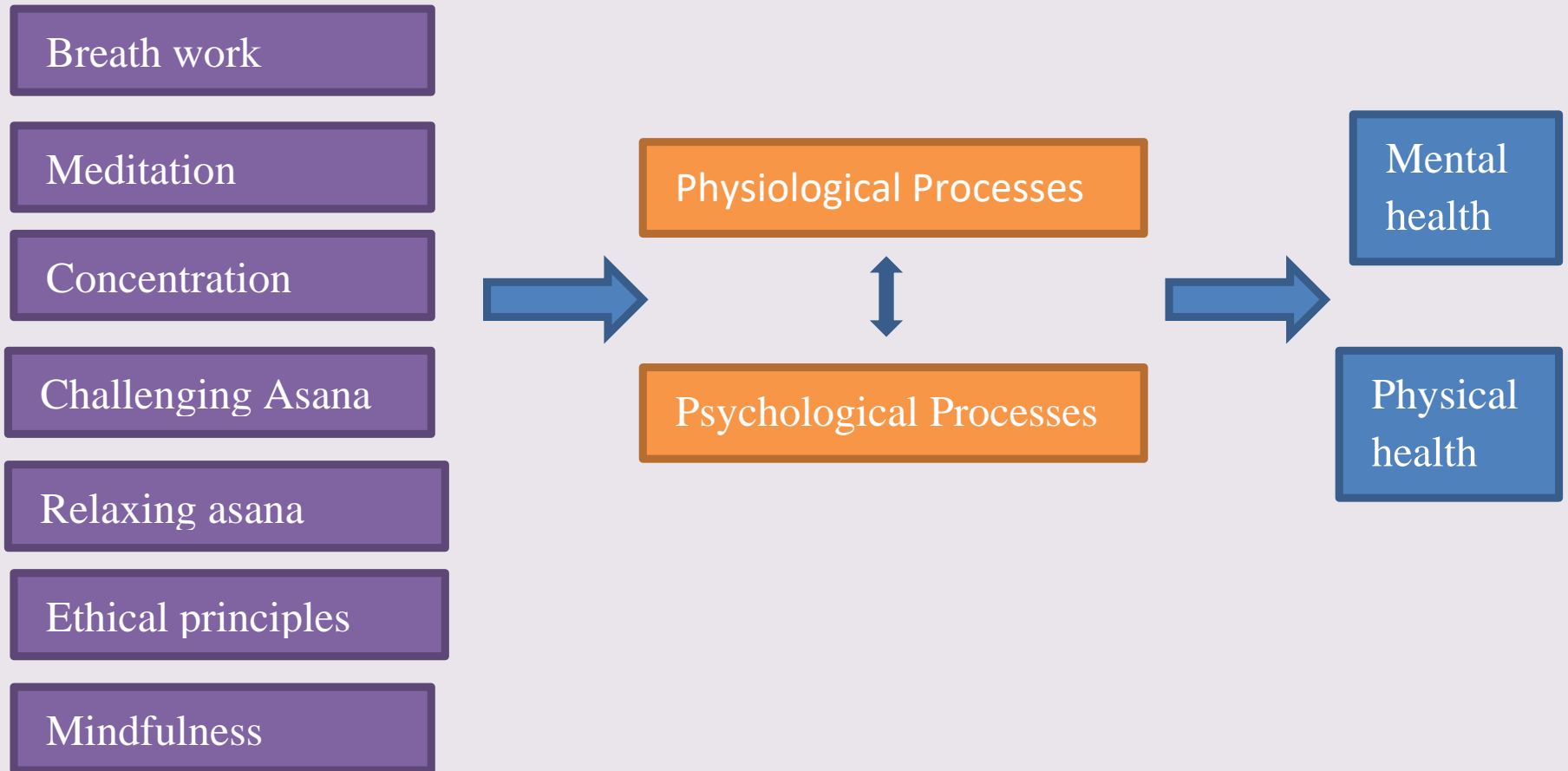
- Emphasis on
  - ✦ alignment
  - ✦ mindfulness
  - ✦ deep or rhythmic breathing
  - ✦ concentration or attention
  - ✦ spirituality
- Focus of cognitive attention
- Room temperature
- Rate of cycling through poses
- Intensity and difficulty of the poses

# Heterogeneity of Yoga Interventions



- Difficult to determine which component—or combination of components—is responsible for any outcome obtained.
- Different yoga interventions—with varying emphases on the various components—may have differential effects on physiological stress responses, biomechanics, and other pathways through which yoga may have effects.

# More Complex Model of Yoga





Do different dimensions of  
yoga have different  
mechanisms of effect?

But first, what are those dimensions of yoga?



# Developing a Measure of Yoga Dimensions



- The Essential Properties of Yoga Questionnaire (EPYQ)
- Designed to address current limitations in the yoga literature and advance yoga research
- Crystal Park (PI), Erik Groessl & Rani Elwy (Co-Is)
- Team: Susan Eisen, Andy Sarkin, Meghan Maiya, Kristen Riley, Tosca Braun, Jennifer Johnson, Chris Streeter, Ian Gutierrez, Lucy Finkelstein Fox, Sharon Lee
- NCCIH-supported: 1R01AT006466-01

# The EPYQ is designed to:



- Allow researchers to design, measure, and specify the amounts of various components used in a particular intervention

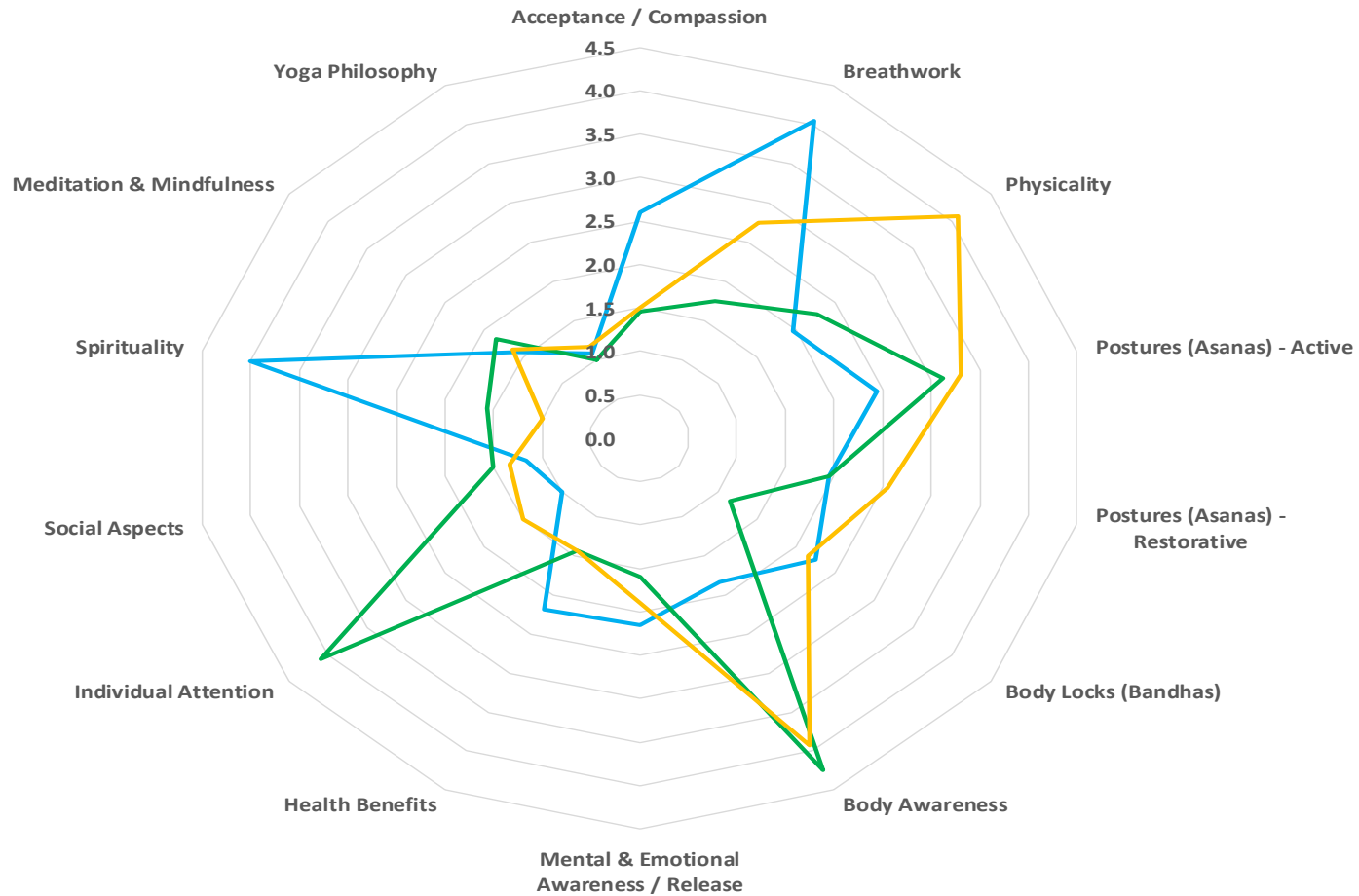
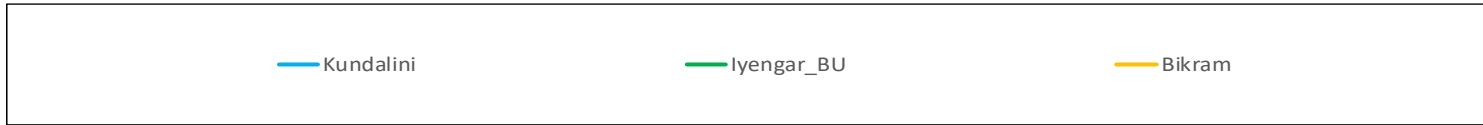
# EPYQ Dimensions



- Acceptance/compassion
- Breathwork
- Physicality
- Postures: Active
- Postures: Restorative
- Body locks (Bandhas)
- Body awareness
- Mental and emotional awareness
- Health benefits
- Individual attention
- Social aspects
- Spirituality
- Meditation/Mindfulness
- Yoga philosophy



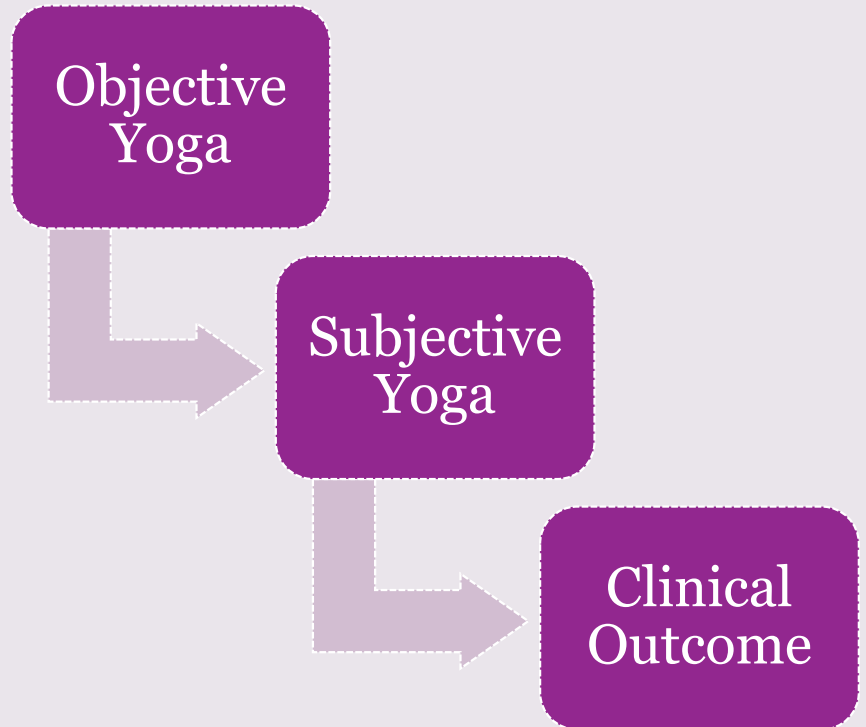
# EPYQ Ratings on Specific Types of Yoga



# EPYQ Dimensions



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