



Effects of **Yoga** on **Stress, Depression, &** **Health-Related Quality of Life** in a non-clinical, bi-ethnic sample of adolescents

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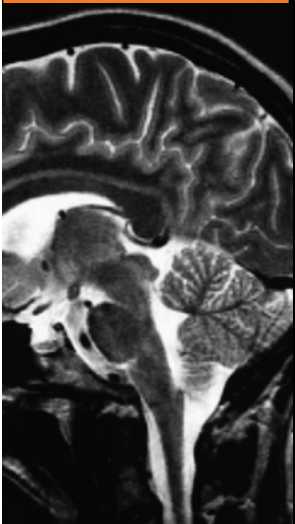
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Mental Illness & Youth

- **One in 5** youth suffers from a **Mental Illness (MI)**
(Costello et al., 1996, Offord et al., 1987)
- **20%** adolescents experience depressive disorder by end HS
(Lewinsohn et al., 1993)
- **MI is associated with:**
 - Early initiation and continuation of **substance use/abuse**
(Deas and Brown, 2006, Wu et al., 2006)
 - Engagement in **risky sexual behaviors**
(Lehrer et al., 2006b)
 - Risk of being a **victim of intimate partner violence**
(Lehrer et al., 2006)
 - Lasting effect on **HRQL & depression**
(Chen et al., 2006; Pine et al., 1999, Reinherz et al., 2003)



Care Seeking & Treatment

- ~80% of all adolescents, ~88% of adolescents of Hispanic background **with mental health needs** **DO NOT** receive or seek professional treatment
(Kataoka et al., 2002)
- **Non-drug modalities** to treat MI gaining in popularity
(Larun et al., 2006, Guskowska, 2005)
- **Exercise-related treatments:**
 - Generally inexpensive
 - Have little to no side-effects
 - May improve other health-related aspects (e.g., weight loss, lower blood pressure)
(Larun et al., 2006)





Yoga, Meditation, & Mindfulness

- **Used to treat PTSD & Pain**
(NPR, March 1st 2007)
- **Associated with...**
 - **Increased HRQL**
(Oken et al., 2006)
 - **Positive Affect**
(Davidson et al., 2003)
 - **Increased Immune Function**
(Davidson et al., 2003)
 - **Decreased depression, stress, anxiety**
(Kirkwood et al., 2005; Parshad, 2004; Pilkington et al., 2005; Woolery, Myers, Sternlieb, & Zeltzer, 2004)
- **Biochemical & Physiological Mechanisms**
 - **Reduced sympathetic nervous tone, stimulation of the limbic system**
(Riley, 2004)





Purpose

Evaluate the effect of practicing yoga within a school setting on adolescents' mental health and HRQL



Methods - Participants

(Beets & Mitchell, in review)

- 55 Students, 9th graders
- 13.9±1.9yrs, 50% Girls, 49% Hispanic
- Small, rural town (~3,163) Pacific Northwest
- One high school
- 4 week Intervention



Methods - Intervention

(Beets & Mitchell, in review)

- **Intervention**

- Certified yoga teacher with over 7yrs of practice and teaching experience
- 2 Physical Education classes
- 4 or 5, **45min** Yoga sessions
- **Centering exercises**
 - Process of accessing calm and focus by closing the eyes, drawing attention to the body and breath, and silencing the mind
- **30 minutes of moderate level flow-style Hatha yoga**
 - Gentle stretching of the muscles followed by a series of postures (e.g., backwards and forwards bends, shoulder, hip, and chest openers, and inversions)
- **5-10min relaxation in the supine position**

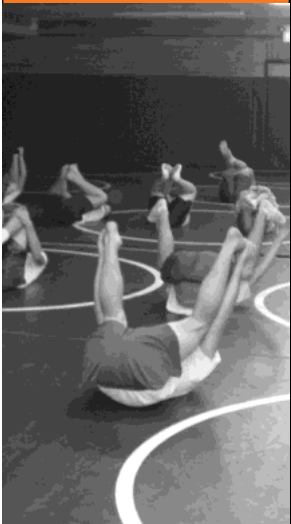
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Methods- Outcomes

(Beets & Mitchell, in review)

- **Perceived Stress Scale (PSS)**
(Cohen et al., 1983)
 - 14 items Stress related to situations in one's life (0 to 56)
- **The Center for Epidemiological Studies Depression Scale (CES-D)**
(Radloff, 1977)
 - 20 items designed to detect depression in the general population (0 to 60)
- **Health-Related Quality of Life (KINDL)**
(Ravens-Sieberer and Bullinger, 1998)
 - 24 items related to the health-related quality of life in adolescents' everyday life (1 to 5)
 - Domains refer to (1) physical well-being, (2) emotional well-being, (3) self-esteem, (4) family, (5) friends, (6) school, and (7) overall score



Methods- Analysis

(Beets & Mitchell, in review)

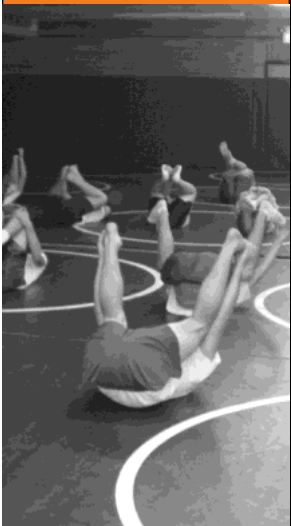
- **2 x 2 crossover design with a baseline measure**
(Ratkowsky et al., 1993)
- **The primary contrasts of interest:**
 - Immediate (i.e., acute) and presence of a carryover effect (i.e., persistence of treatment effect after treatment removal)
- **Random assignment of classes to Treatment **Seq 1** or **Seq 2****
 - Baseline, 2wks (2nd Baseline), & 2wks Yoga (**Seq 1**)
 - Baseline, 2wks Yoga, 2wks WD (**Seq 2**)
- **pkcross** (pharmacokinetic) commands in Stata 9.2
(StataCorp, College Station, TX)
 - Parameter estimation calculated assuming no sequence effects existed



Results

(Beets & Mitchell, in review)

- **Acute effects**
 - Overall HRQL KINDL scale
 - KINDL subscales:
 - Physical health, General feelings, Self-esteem
 - Perceived stress
- **Carry-over effect**
 - KINDL subscales:
 - Self-esteem, Physical health, General feelings
- Average effect size **0.39** and **0.46**



Acute (2wk) and Carry-over (4wk) Effect Estimates

Outcome measure	Treatment Effect		Carryover Effect	
	F^\dagger	p^\ddagger	F^\dagger	p^\ddagger
Health-Related Quality of Life				
Overall	8.95	.002	1.89	.086
Subscales				
Physical Health	7.12	.004	3.12	.040
General Feelings	7.36	.004	2.73	.051
Self Esteem	10.42	.001	5.74	.009
Family	0.42	.259	0.01	.463
Friends	0.48	.246	1.00	.160
School	0.00	.484	0.12	.367
Perceived Stress Scale	4.12	.022	0.01	.452
CES-D	2.14	.073	0.02	.447

[†] F value based on 1 degree of freedom

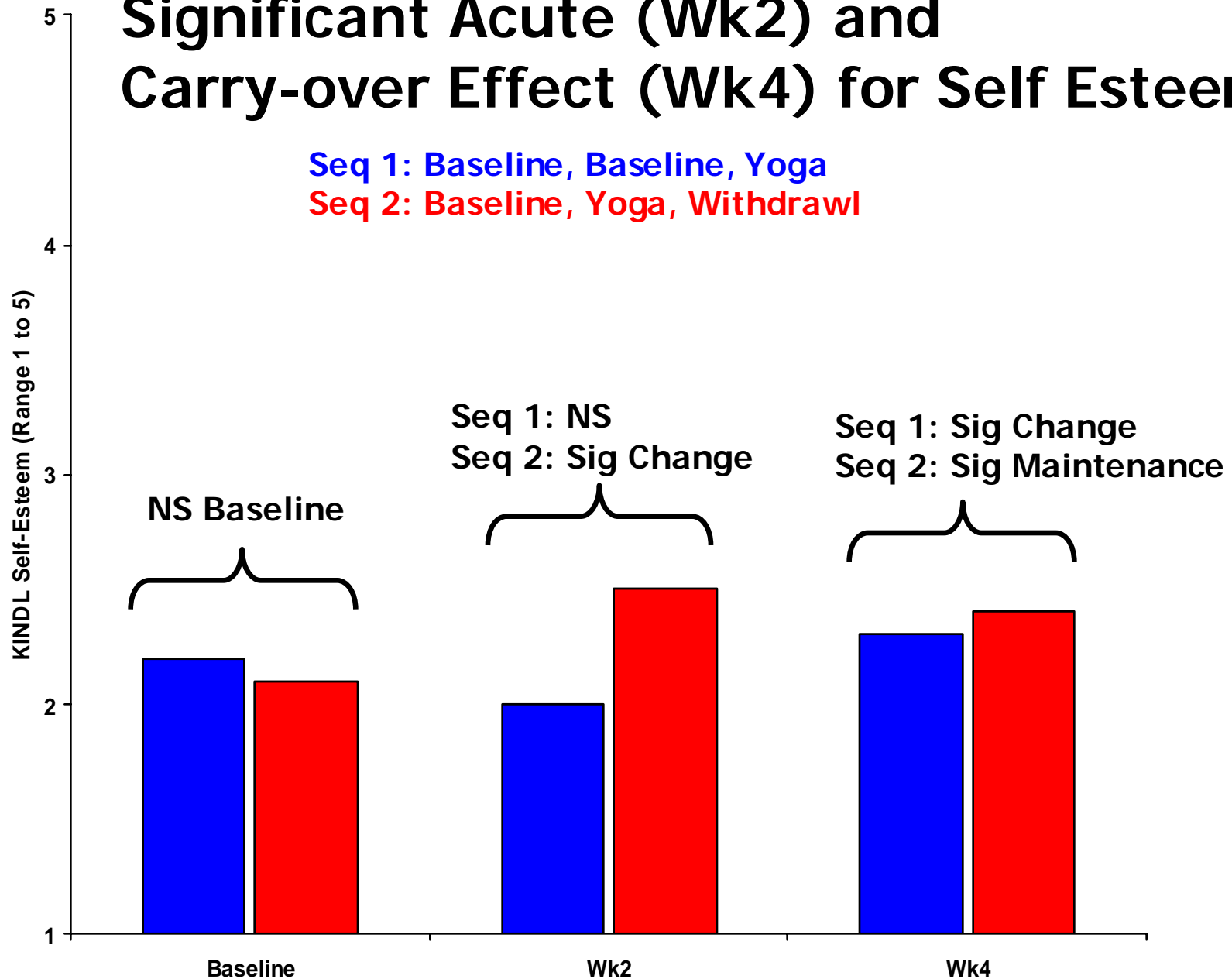
[‡] One-tailed P value

Abbreviation: CESD = The Center for Epidemiological Studies – Depression Scale

Significant Acute (Wk2) and Carry-over Effect (Wk4) for Self Esteem

Seq 1: Baseline, Baseline, Yoga

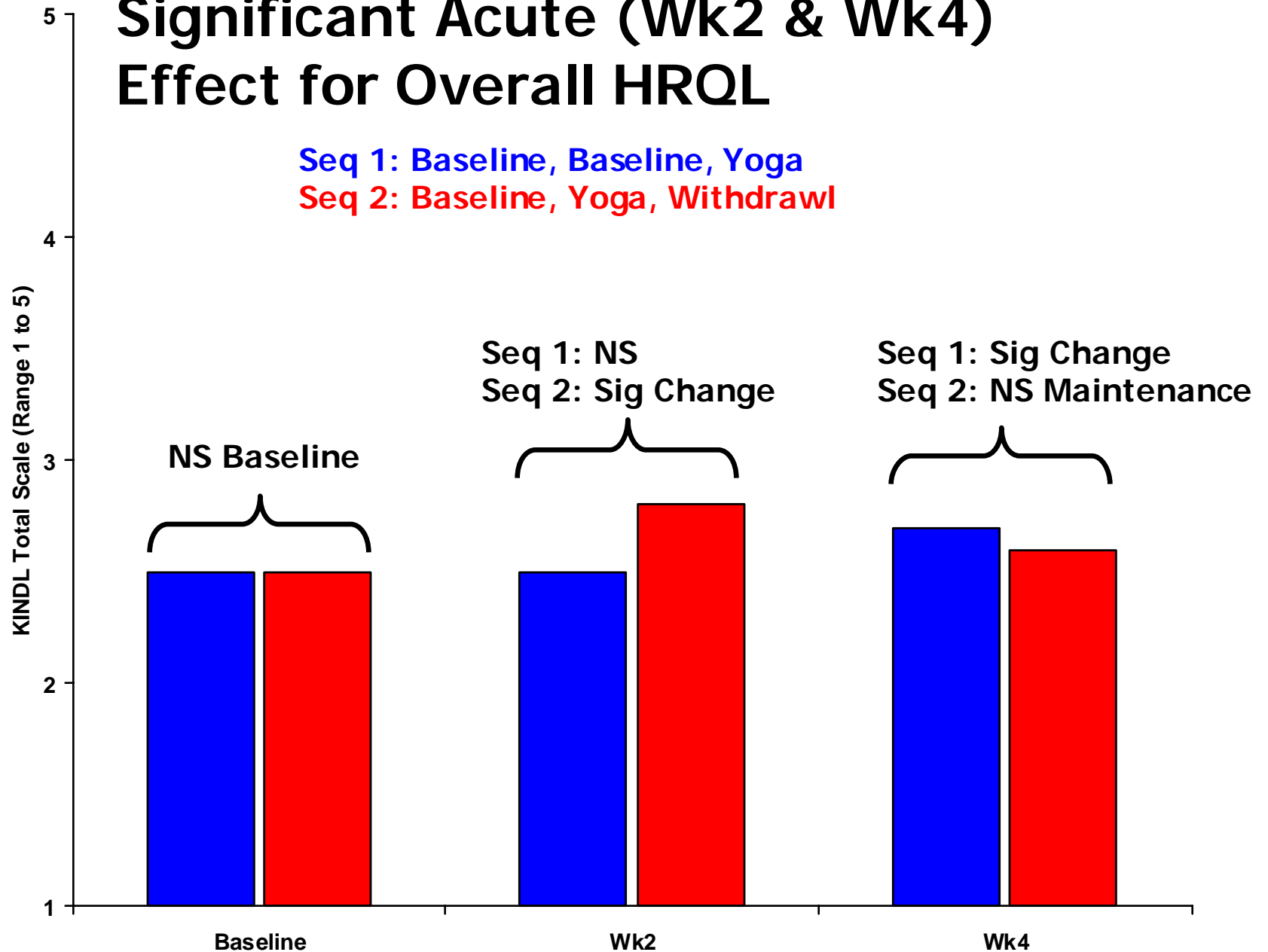
Seq 2: Baseline, Yoga, Withdrawl



Significant Acute (Wk2 & Wk4) Effect for Overall HRQL

Seq 1: Baseline, Baseline, Yoga

Seq 2: Baseline, Yoga, Withdrawl



Utility of Findings

- Improved **HRQL** = reduction in antecedent symptomology of **MI** (depression)
(Dundon, 2006)
- **School-based Yoga program:**
 - Effective in **reducing stress**
 - **Increasing** self-esteem
 - Low levels precursor to depression
- **Most youth attend school**
 - Reach of program (RE-AIM framework)
- **Does not require substantial resources**
 - Initial training and booster sessions





Thank you

Questions & Answers

