


EARN 1.5 CPEUS

Joint Webinar Presentation

ENERGY FOR PRODUCTIVITY AND PEAK PERFORMANCE

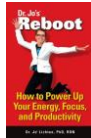
Presented by **Jo Lichten, PhD, RDN** on Thursday, June 21, 2018, 2:00-3:30pm ET





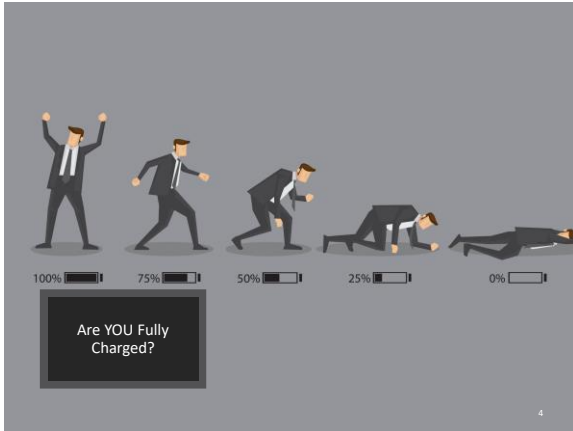
Jo Lichten, PhD, RDN

- **Affiliations/Bio:** Dr. Jo has presented more than 1000 programs to companies and conventions on energy management, staying healthy and fit on the road, and stress solutions. She's the author of five books including her latest, Reboot.
- **Disclosures:** She has certified that no conflict of interest exists for this program.



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Learning Objectives

After completing this continuing education course, nutrition professionals should be able to:

1. Describe how food provides energy for mental, emotional, and physical tasks.
2. Discuss how circadian rhythms can influence the next day's performance – and how to get quality sleep without spending more time in bed
3. Summarize how movement improves energy – and what types of small movement can enhance productivity and focus
4. Examine how thoughts can trigger a physiologically-draining stress response – and how changing thoughts can improve the situation, health, and energy level

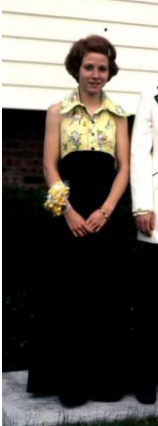
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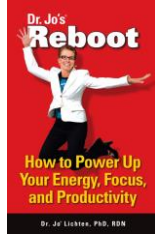


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REBOOT

REBOOT: How to Power Up Your Energy, Focus, and Productivity

- 12 CEU online examination
- With or without book



<https://ce.todaysdietitian.com/DrJoReboot>

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"Energy" Search Terms

- Fatigue, Errors & Accidents
- Stress, Resilience
- Productivity, Performance (work and academic)
- Memory, Cognition, Cognitive Function, Focus, Concentration
- Mood (negative mood = apathy, irritability, tension, and nervousness)
- Mental Health

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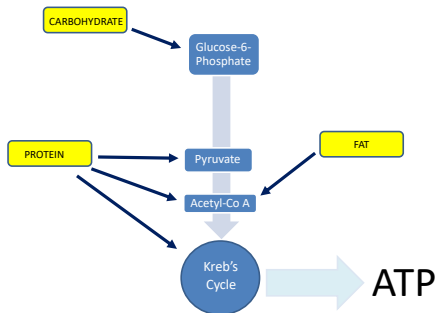
Energy for Productivity and Peak Performance

1. EAT



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Glycolysis + Kreb's Cycle



Harvey et al, *Illustrated Reviews: Biochemistry 5th edition*, 2011

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Cal-o-rie (noun)

Either of two units of heat energy:

1. **calorie** = the amount of heat required at a pressure of one atmosphere to raise the temperature of one gram of water one degree Celsius that is equal to about 4.19 joules
- ★ 2. **Calorie** = the amount of heat required to raise the temperature of one kilogram of water one degree Celsius (1000 gram calories)

<https://www.merriam-webster.com>

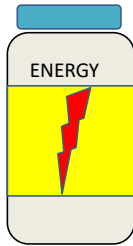
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Caffeine is a Stimulant...Not Energy



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Stimulants Aren't Energy



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How Do You Feel?

When You UNDEReat?

- Hungry?
- Tired?
- Grumpy?
- Hangry
- Difficult to focus?
- Reduced willpower?

When You OVEReat?

- Sluggish?
- Sleepy?
- Unable to focus?

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Energy ≠ Energized

- Energy – usable power
 - Fat is stored “energy”
- Energized – vigorous, active



<https://www.merriam-webster.com>

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**LET
THE
BINGE
BEGIN!**



SLEEP

WORK

HOME

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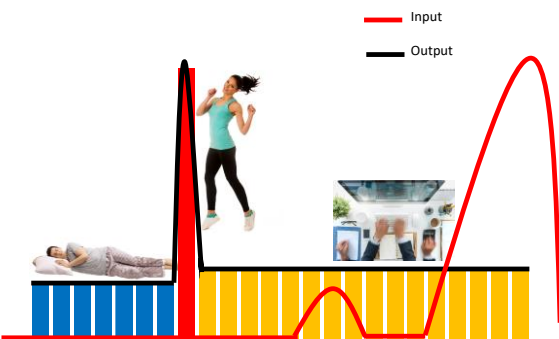
Psychological Problem

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50-70% of our Calorie Needs are to Keep Us Alive (BMR)

Harvey et al, *Biochemistry* 5th edition, 2011

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But, I Have Plenty of Fat Stores!

Unlimited stores

Example:

- Lean 120# woman (18% body fat)
- = 21.6# fat
- = 75,600 calories stored fat



Harvey et al, *Biochemistry 5th edition*, 2011

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Brain = 2% Body Weight

The brain can't run on fat

It uses 20% of our calorie requirement
...in the form of glucose

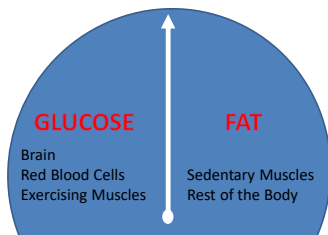
Red blood cells require glucose, too



Harvey et al, *Biochemistry 5th edition*, 2011

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We Burn TWO Fuels: 50/50 Blend



Harvey et al, *Biochemistry 5th edition*, 2011

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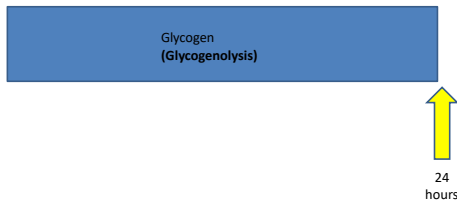
Fuel "Storage"

- Glucose
 - <20 calories in fasting blood stream
 - 90mg/dl = 900mg/l
 - There are 5 liters of blood
 - 4500mg/5 liters OR 4.5g X 4.2 calories = 19 calories
- Glycogen
 - 300 calories stored in liver (75g)
 - Muscle glycogen is only for fueling muscles

Coffee, *Metabolism*, 1999

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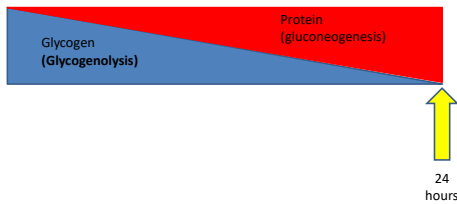
Glycogen Stores Last 24 Hours



Coffee, *Metabolism*, 1999

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Glycogen Stores Last 24 Hours



Coffee, *Metabolism*, 1999

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DOES WHEN YOU EAT MATTER??



NO



YES

- ✓ Body composition
- ✓ Optimal health
- ✓ LASTING ENERGY

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Study

- On national teams or nationally ranked
 - 42 gymnasts (\bar{x} 15.5 yrs)
 - 20 runners (\bar{x} 26.6 yrs)
- Measured
 - Body composition
 - Energy balance (comparing intake & expenditure)

Within-day energy deficits are associated with higher body fat percentage in both anaerobic and aerobic elite athletes

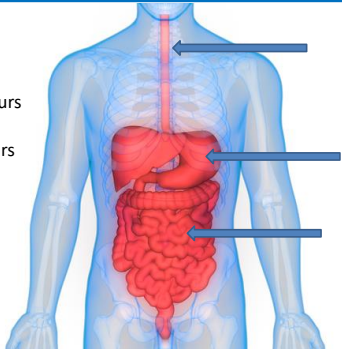
Deutz et al, *Med Sci Sports Exerc*, 2000

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Overfueling

Small Snack: 1-2 hours

Large Meal: 4-5 hours



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Excess Calories Can't Circulate in the Blood Stream...Until You Need Them



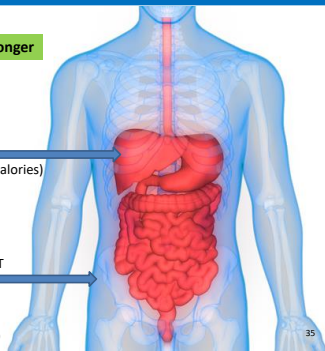
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Where Do the Excess Calories Go?

Big meals don't "fuel" you longer

12% 1. LIVER
(up to 300 calories)

88% 2. FAT



McDevitt et al, *Am J Clin Nutr*, 2000

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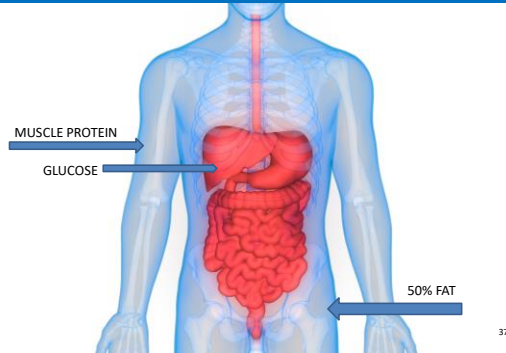
Big Meals can Make You Feel Hungry

Exaggerated insulin release following a meal, can prompt transient hypoglycemia with mild adrenergic symptoms



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Intake vs Output : Underfueling



“Listen to Your Hunger”

0 1 2 3 4 5 6 7 8 9 10



So hungry that you
don't feel hungry

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Protein-Sparing Ketones

- Only $\frac{1}{2}$ of body's protein can be utilized before death occurs
 - Red blood cells continue to require glucose
- After 2-3 days of fasting – the brain starts using ketone bodies
- At 18 days
 - $\frac{2}{3}$ ketones
 - $\frac{1}{3}$ glucose + $\frac{1}{10}$ protein catabolism

Owen, *Biochemistry and Molecular Biology Education*, 2005

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Breakfast and Cognition

- Review of 45 studies with children/adolescents¹
 - Breakfast consumption is more beneficial than skipping breakfast
- 800 nurses in UK² - frequency of breakfast consumption was associated with
 - lower stress
 - fewer cognitive failures
 - injuries and accidents at work

¹Hoyland et al, *Nutr Res Rev*, 2009
²Chaplin et al, *Nutrients*, 2011

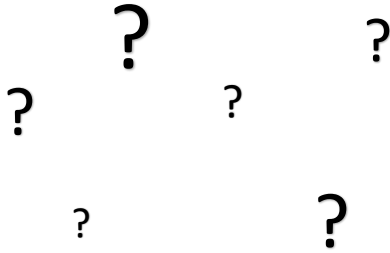
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Eating Factors

- Eat three meals at regular intervals
- Match intake with output
 - including before/during/after exercise
- Listen to your hunger
 - eat when you're hungry, but not too hungry

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Questions about "Food as Fuel"?



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Energy for Productivity and Peak Performance



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Too Little Sleep Has Been Associated with:

- Weight Gain¹
- Type 2 Diabetes²
- Metabolic Syndrome²
- Coronary Heart Disease²
- Hypertension²



¹St-Onge et al, *Sleep*, 2012
²Aldabal and Bahammam, *Open Resp Med J*, 2011

45

Other Functions of Sleep

- Memory consolidation¹
- Healthy emotions and mood²



1 Diekelmann et al, *Sleep Med Rev*, 2009
2 Goldstein et al, *Annu Rev Clin Psychol*, 2014

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Drunk or Tired?

After being awake for 17-19 hours, cognitive psychomotor performance is the same as those with blood alcohol levels of 0.05%

After 24 hours, it's the equivalent of those with blood alcohol levels of 0.10%



Williamson and Feyer, *Occup Environ Med*, 2000

47

Loss of Cognitive Function

Chronic restriction of sleep (4 or 6 hrs) over 14 consecutive days:

- Sleepiness was similar with 4 vs 6 hours, but performance was worse with 4
- Day 10 of 6 hours sleep: performance similar to staying up for 2 nights



Van Dongen et al, *Sleep*, 2003

48

Sleep Loss Reduces Productivity

- Missed work (2X)¹
 - ↑ Short-term sickness
 - ↑ Long-term sickness
- Strong predictor of permanent work disability¹
- Annual losses in work performance due to insomnia = \$91.7 billion/year. (Based on data from 7428 US workers)²

¹Kant et al, *Occup Environ Med*, 2003
²Kessler et al, *Sleep*, 2011

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Errors & Accidents

- 2.4% of fatal motor vehicle accidents and 2% of all crashes involve drowsy driving¹
- A 2012 report by the World Health Organization identified fatigue as one of the causes of medical error and injury in healthcare²



¹National Highway Traffic and Safety Administration website
²World Health Organization website

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Am I Getting Enough Sleep?



How Long to Fall Asleep?

- Time to Fall Asleep¹
 - Normal alertness = 10+ minutes
 - Abnormal = < 8 minutes
- Increasing night sleep consistently increased the time it took to fall asleep during the daytime²

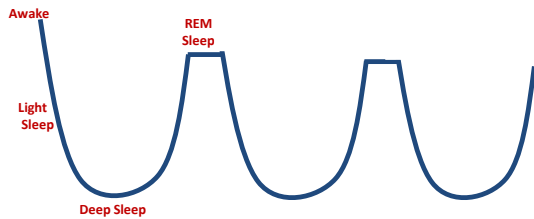
¹Schwartz et al, *Prim Care Companion J Clin Psychiatry*, 2009
²Bonnet, *Sleep*, 1995

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It's not just about the QUANTITY of sleep...

The (90-Minute) Sleep Cycle



Brinkman et al, *Physiology*, Sleep, 2018

54

Sleep Interrupted



Sleep Continuity Disruption

- Randomly assigned to receive 3 consecutive nights of sleep via:
 - Uninterrupted sleep (N = 24)
 - Forced nocturnal awakenings (N = 21)
 - Restricted sleep opportunity (N = 17)
- significantly less slow wave sleep
significantly lower positive mood
- Same amount of sleep

Finan et al, *Sleep*, 2015

56

Mood & Sleep Regularity

- Positive mood is linked to improved performance, cognition, and memory
- Sleep regularity was a more important discriminator of happy/sad mood than sleep duration for most participants

Sano et al, 2015 Conference proceedings: Annual International Conference of the IEEE Engineering in Medicine and Biology Society IEEE Engineering in Medicine and Biology Society Annual Conference

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Sleep Regularity

- 61 college undergraduates for 30 days
- Used sleep diaries, sleep regularity index (SRI)
- Measured circadian phase and light exposure

Irregular sleep and light exposure patterns are associated with delayed circadian rhythms and lower academic performance

Phillips et al, *Sci Rep*, 2017

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Three Important Sleep Factors

- Get adequate hours of sleep
- Avoid factors which interrupt sleep
- Go to sleep at regular times

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Questions about "Sleep & Energy"?

? ? ?
?
? ?

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Energy for Productivity and Peak Performance

3. MOVE



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Brisk Walking Program

- 86 High-tech Employees in Taiwan
- Randomly assigned
 - 8-week outdoor brisk walking program
 - Control group

Brisk walking significantly improved the level of fatigue

Wu et al, *Workplace Health Saf*, 2015

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Sleep, Exercise, Stress

- Diary study over 5 consecutive working days
 - 144 employees who answered daily online surveys
- Exercise after work was positively related to the next day's personal resources when sleep duration during the night time was longer compared to other nights
- Personal resources positively related to lower emotional exhaustion after work on the next day

Nagel U et al, *Appl Psychol Health Well Being*, 2013

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30-Minutes Exercise or Sleep

- 247 low-active healthy older adults, ~ 60-70 years
- 6-month randomized controlled trial
- Substituted 30 min of sedentary behavior with:
 - 30 min light activity
 - 30 min moderate-to-vigorous physical activity
 - 30 min sleep

No significant effect

Bolstered several important domains of self-regulatory behavior & executive function

Fanning et al, *Journal of behavioral medicine*, 2017

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5- Minute Microbouts of Activity

- 30 sedentary adults completed each condition:
 - 6 h of uninterrupted sitting (SIT)
 - SIT + 30 min of moderate-intensity treadmill walking in morning (ONE)
 - SIT + six hourly 5-min microbouts of moderate-intensity treadmill walking (MICRO)

Increased self-perceived energy, improved mood, decreased fatigue, reduced food cravings at end of day

Bergouignan et al, *Int J Behav Nutr and Physical Activity*, 2016

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3- Minute Microbouts of Activity

1. Initial 2 hour period seated
2. Consumption of a meal-replacement beverage
3. Completed each condition over the next 5 hr:
 - uninterrupted sitting or
 - sitting with 3 min bouts of light-intensity walking every 30 minutes

Fatigue levels lower

Wennberg et al, *BMI Open*, 2016

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Intermittent Standing

- Two 5-day experimental conditions in an equal, randomized order
- Simulated office environment, participants performed their usual occupational tasks for 8 hr/day:
 - Seated work posture (SIT condition)
 - Interchanging between a standing and seated work posture every 30 min (electric, height-adjustable workstation)

concentration/focus significantly higher

Total fatigue score significantly lower

Lower back musculoskeletal discomfort significantly reduced

trend towards improved overall work productivity

Thorp et al, *Occup Environ Med*, 2014

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Standing & Productivity

- Compared objective measures of productivity (successful calls completed per hour) in a call center over 6-months
- Two groups (N=167)
 - Stand-capable desk users
 - Seated control group

~45% more productive

Productivity significantly increased from:
~23% in the 1st month to
~53% at 6 months

Garrett et al, *IIE Transactions on Occupational Ergonomics and Human Factors*, 2016 69

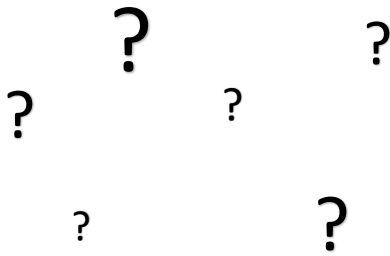
Systematic Review of Active Workstations

- **Sit-stand desks** had no detrimental effect on performance
- Some studies with **treadmill and cycling workstations** identified potential decreases in performance
- **Prolonged use of an active workstation** for between 12 and 52 weeks
 - No significant effect on productivity

Ojo et al, *Int J Environ Res Public Health*, 2018

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Questions about “Movement & Energy”?



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Energy for Productivity and Peak Performance

4. THINK



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Stress Response (a.k.a. Fight or Flight)

Cortisol and Adrenaline



Increased oxygen and fuel

- Increased pulse and heart rate
- Increased breathing rate
- Release of stored glucose

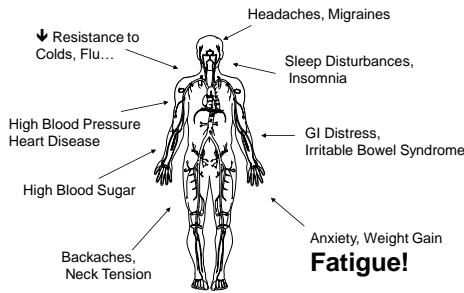
Barker et al, *Neuroscience at a Glance (3rd edition)*, 2008.

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Chronic Stress



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Job-Related Factors and Fatigue

3109 industrial employees in Taiwan

1. **Demographics**
2. **Prolonged fatigue**
3. **Physical condition**
 - perceived physical health and exercise routine
4. **Psychological condition** ★
 - perceived mental health and psychological distress
5. **Job-related psychosocial factors**
 - job demand, job control, and workplace social support

Tang et al, *PLoS ONE*, 2016

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Positive vs Negative Stress

- 1,195 full-time working adults
 - Assess fatigue at two time points (morning and during work)
 - Employees' eustress and distress experiences during work
- **Distress** (stress and pain) predicted
 - higher morning fatigue + stronger increases in fatigue during workday
- **Eustress** (happiness and meaningfulness) predicted
 - lower fatigue at both time points but not temporal changes

Parker et al, *Appl Psychol Health Well Being*, 2015

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Psychological Contract Breach

- **Psychological Contract (PC)**
 - Beliefs about reciprocal obligations between employees & their employer based on explicit and implicit promises
- **PC breach**
 - when employees perceive that their organization failed to fulfill one or more obligations
- **Perceptions of PC breach**
 - leads employees to experience negative emotions, resulting in elevated stress levels ← **Greater when more fatigued**

Achnak et al, *Frontiers in Psychology*, 2018

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Microbreaks & Productivity

- 71 call center employees
 - Two daily surveys
 - Daily sales performance records for 2 consecutive weeks
- Breaks for snacks and drinks **No significant effects**
- Relaxation, socialization, & cognitive microbreaks
 - increased positive affect at work which, in turn, predicted greater sales performance**

Kim et al, *J Appl Psychol*, 2018

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Optimist or Pessimist?



Half-Full or Half-Empty?

Afshar et al, *J Res Med Sci*, 2015
Sharpe et al, *Person Indiv Diff*, 2011

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Learned Optimism: BAD THINGS

- **Optimists:**
 - Temporary
 - Specific
 - External



- **Pessimists:**
 - Permanent
 - Universal
 - Internal

Seligman, Harv Bus Rev, 2011

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Learned Optimism: GOOD THINGS

- **Optimists:**
 - Permanent
 - Universal
 - Internal



- **Pessimists:**
 - Temporary
 - Specific
 - External

Seligman, Harv Bus Rev, 2011

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Stressful/Ruminative Thinking

- Randomly assigned to write for 20 minutes X 3 days about:
 - their most stressful life experience (n=39)
 - positive life experiences (n=42)
 - plans for the day (n=41)
- Reported the extent to which they thought about their assigned writing topic during the study and in the past
- Measured:
 - Cortisol
 - Upper respiratory infection (URI) symptoms

Among participants who wrote about stressful/traumatic events, higher stress-related thinking during the study predicted increased cortisol levels and URI symptoms compared to participants who reported low stress-related thinking.

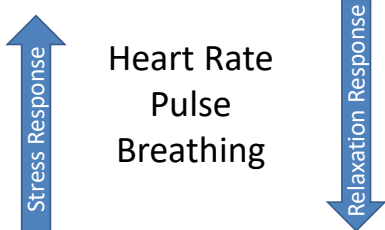
O'Connor et al, *Psychoneuroendocrinology*, 2013

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The Relaxation Response



Dusek, et al, *Minn Med*, 2009

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Mindfulness-based Stress Reduction (MBSR)

Mindfulness: Awareness that arises through deliberately paying attention in the present moment, non-judgmentally



Kabat-Zinn, *Clinical Psychology: Science and Practice*, 2003

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Mindfulness-based Cognitive Therapy (MBCT)

- MBCT integrates aspects of cognitive-behavioral therapy for depression into the mindfulness-based stress reduction (MBSR)
- MBCT teaches patients to become more aware of, and to relate differently to, their thoughts, feelings, and bodily sensations

Williams et al, *Journal of Consulting and Clinical Psychology*, 2008

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WorkingMind

- 2 day-long training days plus:
 - eight 2.5 h-long sessions
 - Practice for 10+ min/day w/app-based audio recording
- Formal + informal meditation practices including:
 - Meditations – mindfulness, walking, pausing, compassion
 - body scan
- Encouraged to practice mindfulness in everyday life:
 - mindful communication, emailing, team experiences
 - noticing positive experiences
 - daily journaling

Kersemaekers et al, *Frontiers in Psychology*, 2018

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Workplace Mindfulness Training (WMT)

- 425 participants in four companies
- Self-report questionnaires were administered:
 - before + start + end of the WorkingMind Training
- Significantly greater improvements:
 - burnout, perceived stress, mindfulness, well-being
- Greater increases:
 - team climate, organizational climate, personal performance
- Largest improvements:
 - team cooperation, productivity, and stress

Kersemaekers et al, *Frontiers in Psychology*, 2018

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Mindful2Work

- N= 26 (four males):
 - pre and post the intervention + 6-week and 6-month follow-up
- 6 weekly sessions (2 h) + 6M follow-up session consisting of:
 - physical exercise (20 min)
 - yoga (20 min)
 - mindfulness meditation including psycho-education (80 min)
- Asked to practice daily at home:
 - daily mindfulness practices (about 20 min per day)
 - 1-2 X weekly: yoga (10 min) + physical exercise (20 min)

Significant improvements - physical and mental workability, anxiety, depression, stress, sleep quality...

De Bruin et al, *Mindfulness*, 2017

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Review

- Studies from January 2009 to January 2014
- 16/17 demonstrated positive changes in psychological or physiological outcomes related to anxiety and/or stress

Mindfulness-based stress reduction appears to be a promising modality for stress management

Sharma et al, *J Evid Based Complementary Altern Med*, 2014

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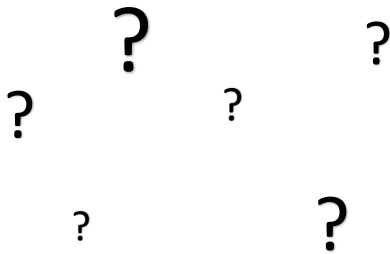
For More Info about Stress Solutions

2 Hour CEU Available



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Questions about "Stress & Energy"?



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Summary

1. EAT

3. MOVE



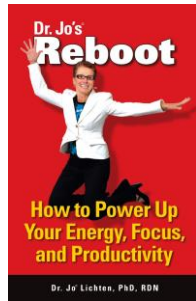
2. SLEEP



4. THINK

Energy for Productivity & Peak Performance

- Want to know more?
 - Today’s Dietitian’s 12 hr CEU
- Follow me on Social Media
 - @GoDrJo
- Enews:
 - Text DRJO to 22828



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Questions?
Thank You!



Please stay in touch at
www.DrJo.com
 @GoDrJo

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2. Click “Take Course” on the webinar description page.
3. Select “Start/Resume Course” to complete and submit the evaluation.
4. Download and print your certificate.

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