The Resilient Leader
PTC 2015

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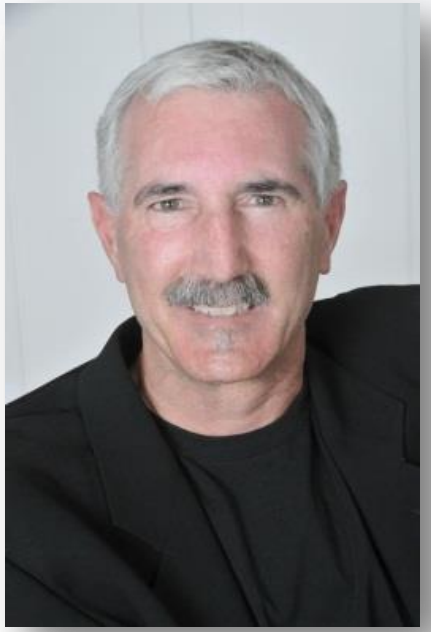
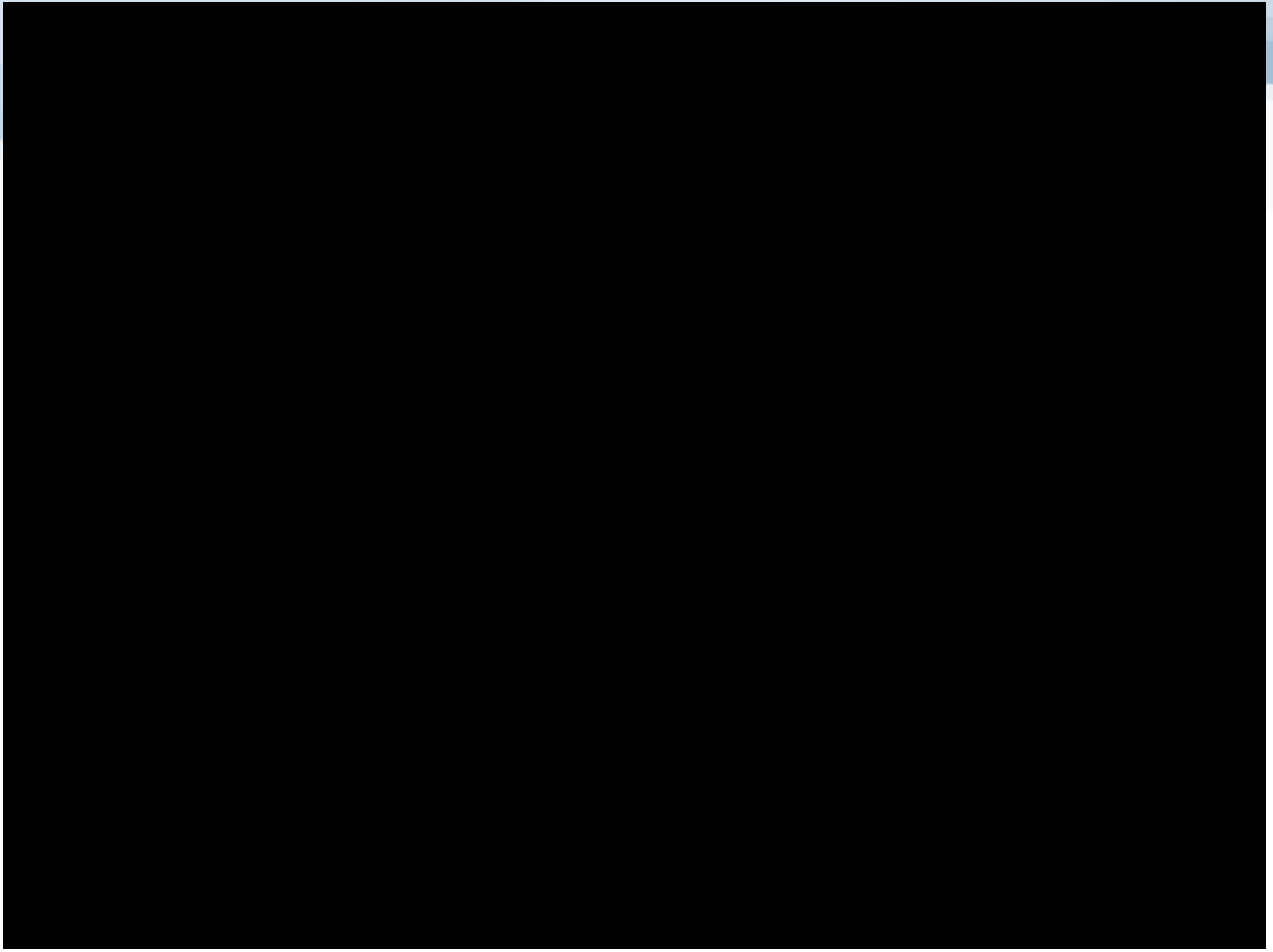


Dr. Nowack received his doctorate degree in Counseling Psychology from the University of California, Los Angeles and has published extensively in the areas of leadership development, assessment, health psychology, and behavioral medicine.

Ken serves on Daniel Goleman's Consortium for Research on Emotional Intelligence in Organizations and is a guest lecturer at the UCLA Anderson School of Management.



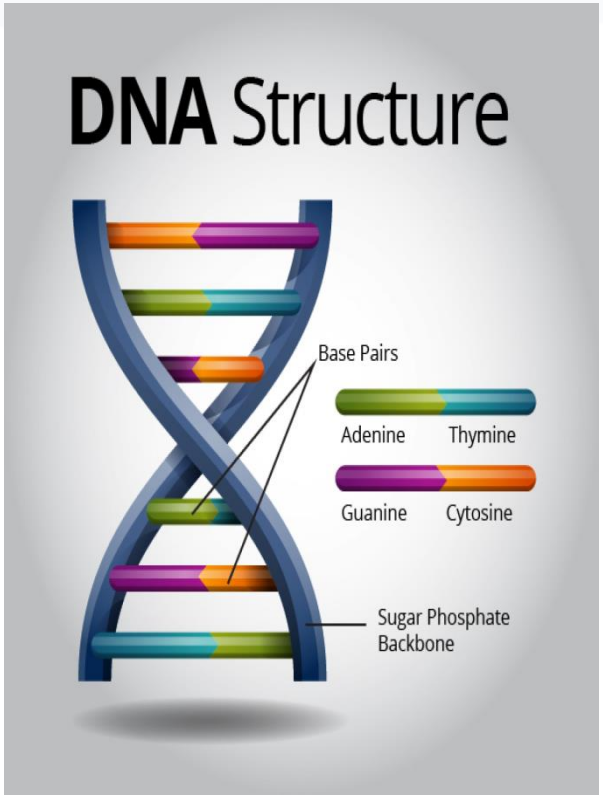
The Resilient Leader

- What is Resilience?
- Resilience, Health and Performance
- The Resilience Inventory
- Resilience and Sleep: Connected Befellows
- Questions

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.”

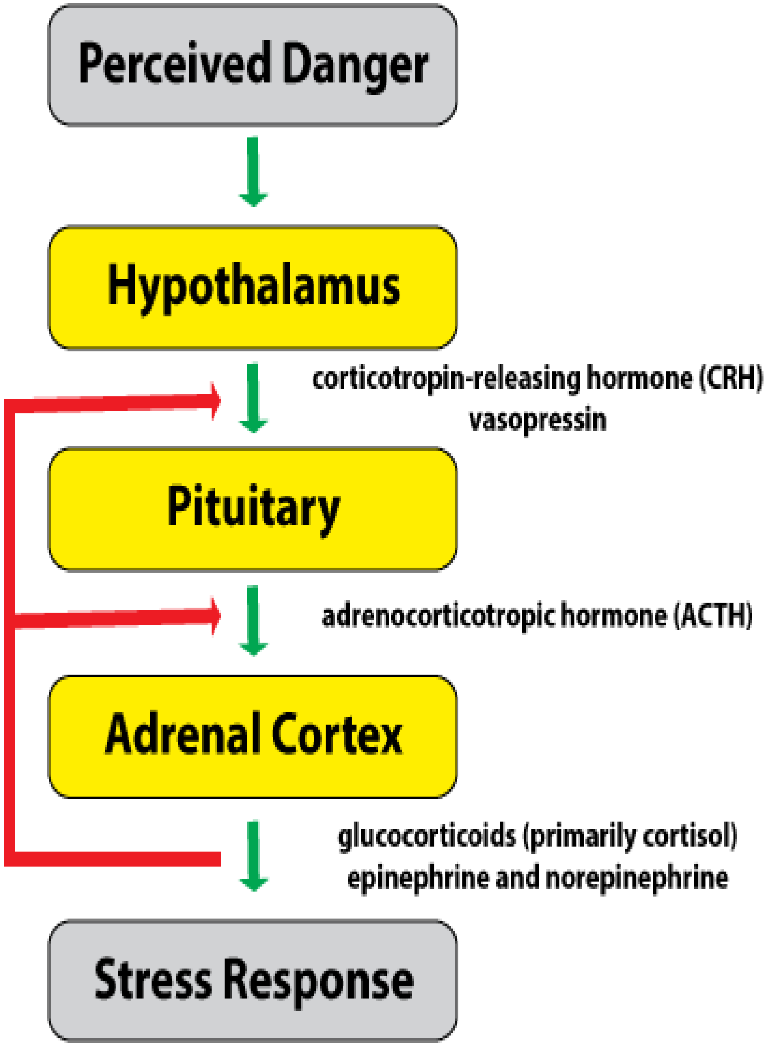
Charles Darwin

Five Basic Human Drives (Nowack, 2015)

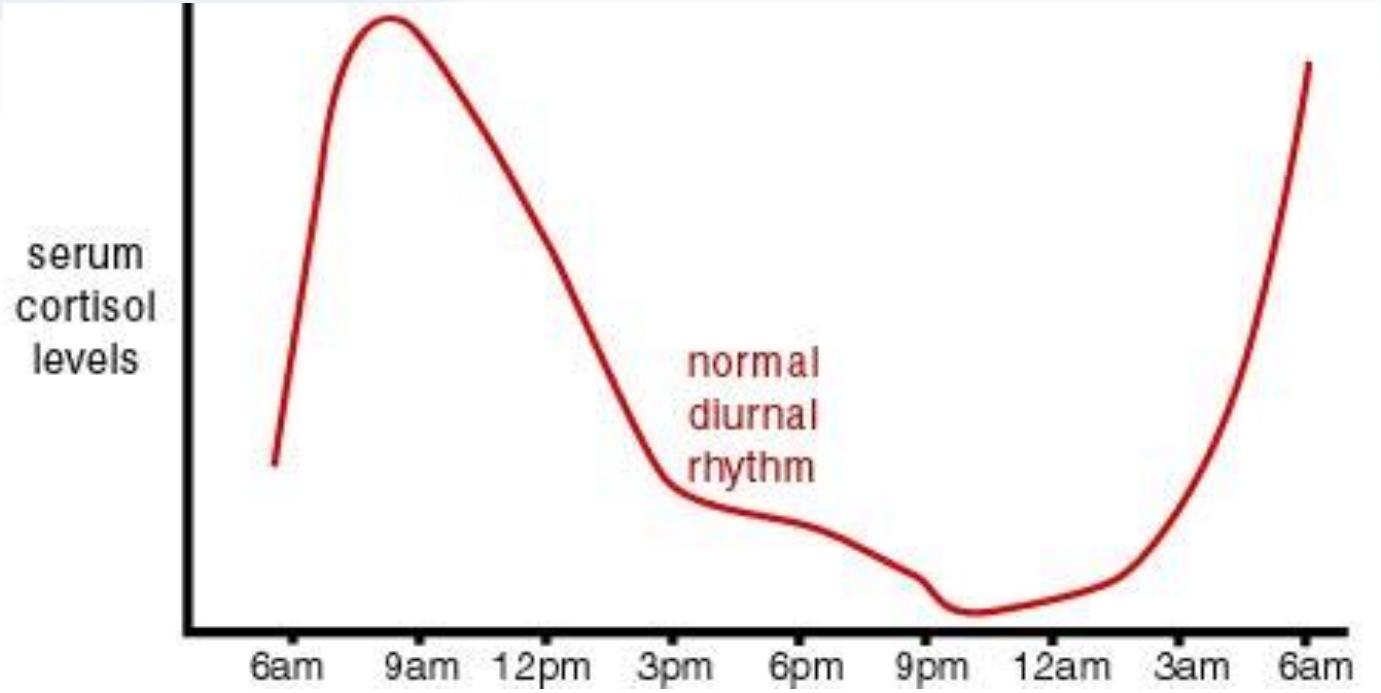


- **Approach/Avoidance**
- **Affiliation/Bonding**
- **Autonomy/Control**
- **Mastery/Growth**
- **Purpose/Hope**

Stress Response (HPA Axis)
Threat—Hindrance—Challenge Stressors



The Circadian Rhythm of the Stress Hormone Cortisol



High Flat Level Profile	Depression/Sleep Deprivation
Low Flat Level	Job Burnout/PTSD

Emotional Stability and Job Performance

- Meta-analysis of 71 samples (N = 7,535) demonstrated that emotional stability significantly predicted adaptive performance (ability to meet unexpected or changing demands of one's work)

- Emotional stability exhibited moderate validities of .28 and .26, respectively, with task performance and contextual performance

Huang et al., (2015). Personality and adaptive performance at work: A meta-analytic investigation. *Journal of Applied Psychology, 99,* 162-179

Rojon, C., McDowall, A. and Saunders, M.N.K. (2015) The relationships between traditional selection assessments and workplace performance criteria specificity: A comparative meta-analysis. *Human Performance 28.1*, 1-25

Emotional Stability and Job Performance

- Conscientiousness and Agreeableness emerged as the *most highly sought* attributes by interviewers
- Attributes related to emotional stability (resilience) were *less likely* to be included
- Designers of structured interviewing system *shied away* from assessing emotional stability because they perceived those attributes as either difficult to assess via interview or as an uncomfortable topic to raise in interviews

Sackett et al., (2014). Which Personality Attributes Are Most Important in the Workplace? *Perspectives in Psychological Science, 9*, 538-551

“Live each day as if it is your last for one day it will be.”

Unknown

Definition of Resilience

Resilience refers to positive adaptation or the ability to maintain physical health and psychological well-being in the face of life adversity and challenge

Herrman, et al., 2011

Neurobiology of Hardiness/Resilience

Cortisol Awakening Response (CAR)

Inslicht, S. et al., (2011). Cortisol Awakening Response Prospectively Predicts Peritraumatic and Acute Stress Reactions in Police Officers. *Biological Psychiatry, 70*, 1055-1062

CAR is *elevated* in non-hardy individuals upon awakening

Neuropeptide Y

Morgan C. et al., (2002). Neuropeptide Y, cortisol, and subjective distress in humans exposed to acute stress: Replication and extension of previous report. *Biological Psychiatry*, 52, 136-142

Amino acid that regulates blood pressure, appetite, memory and anxiety reduction *increases* in hardy individuals

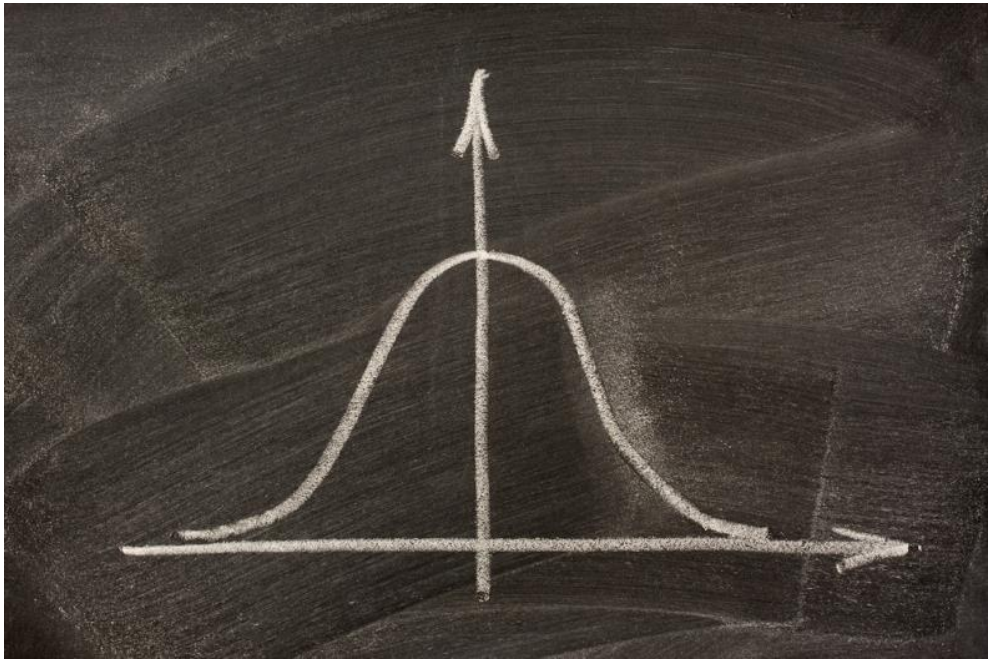
DHEA

Morgan, C. et al., (2004). Relationships Among Plasma Dehydroepiandrosterone Sulfate and Cortisol Levels, Symptoms of Dissociation, and Objective Performance in Humans Exposed to Acute Stress. *Archives of General Psychiatry, 61*, 819-825

Natural steroid is released in *higher amounts* in hardy individuals

Twin studies have estimated an overall heritability of posttraumatic stress disorder (PTSD) ranging from 32 to 38% (Southwick et al., 2012)

The Inverted-U Curve of Resilience



A history of <u>some</u> lifetime adversity predicts better health outcomes than *high or no* adversity

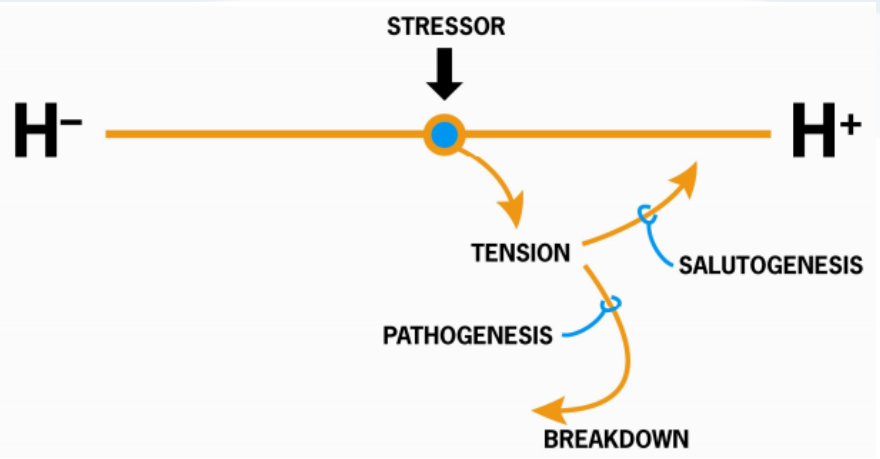
Seery, M. (2011). Resilience: A silver lining to experiencing adverse life events? *Current Directions in Psychological Science, 20,* 390-394.

“Things turn out best for those who make the best of how things turn out.”

Jack Buck

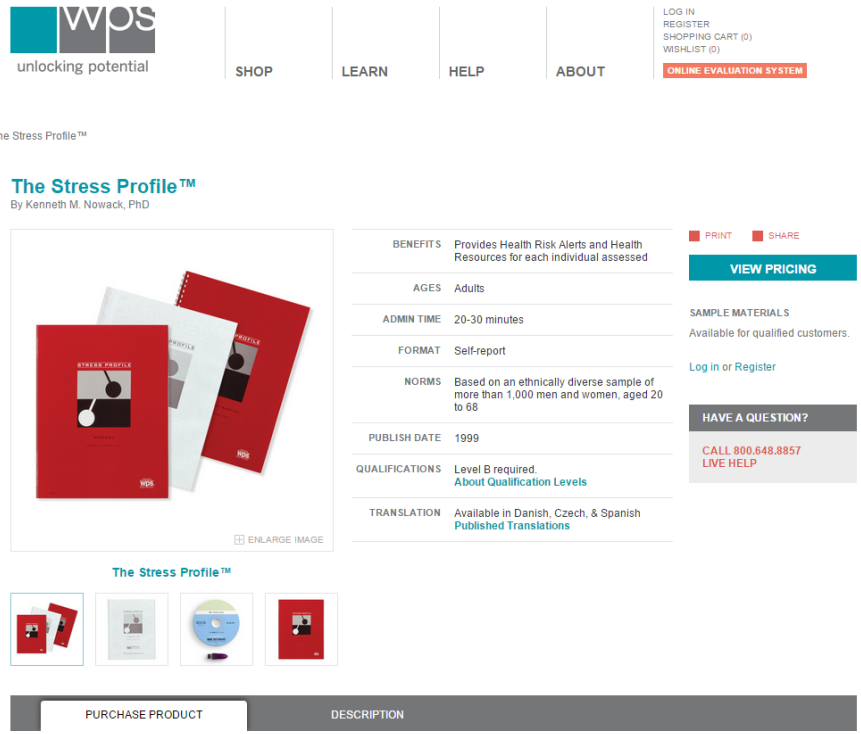
Models of Hardiness/Resilience

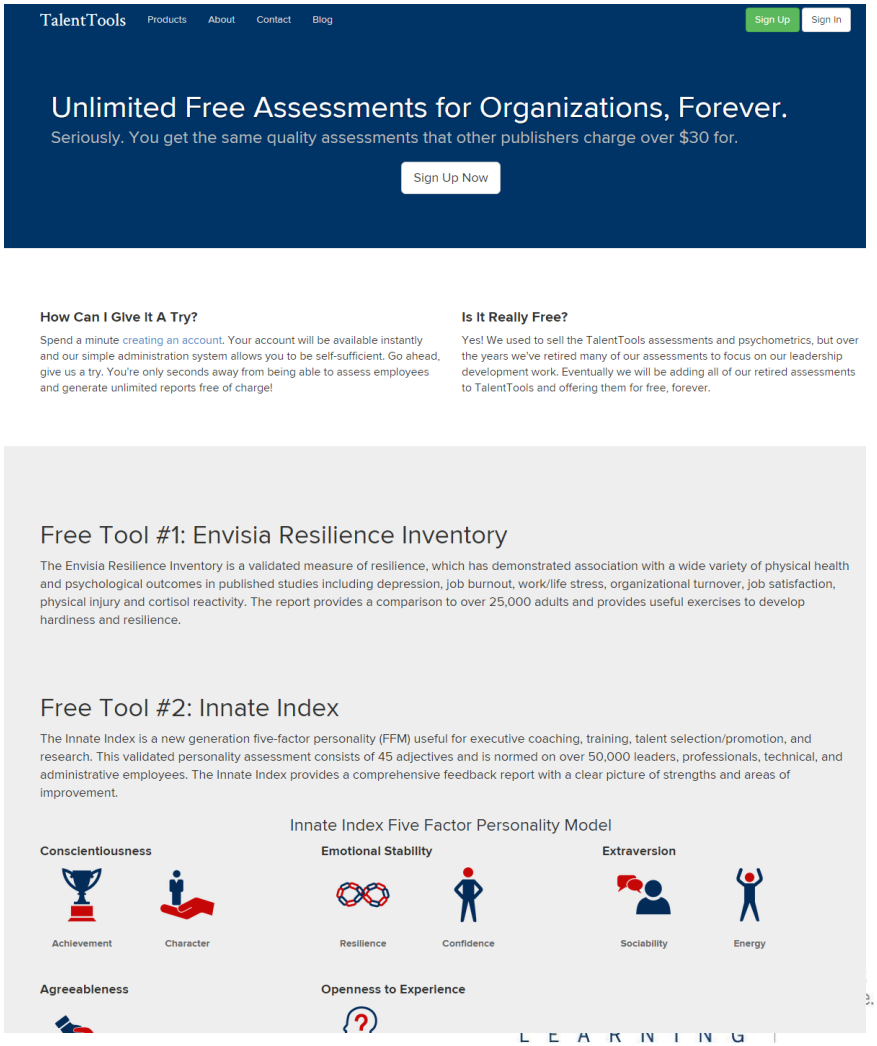
- Salutogenesis/Sense of Coherence (Antonovosky, 1979)
- Post-Traumatic Growth (Tedeschi & Calhoun, 2004)
- Job Burnout (Maslach, 1978; 2001)
- Personality Hardiness (Kobasa, 1979)
- Grit/Toughness (Dienstbier, 1989; Duckworth, 2007)
- Optimism/Positive Affectivity (Seligman, 1990; Segerstrom, 2006)
- Psychological Capital (Avey, Luthans & Jensen, 2009)--self-efficacy, hope, optimism & resilience
- Core Self Evaluation (Judge et al., 1997)--locus of control, neuroticism, self-efficacy, self-esteem
- Repressive Coping (Schwartz et al., 1995)
- Cognitive Hardiness (Nowack, 1999)
- Flourishing (Fredrickson, 2001)--Broaden & Build theory of positive emotions
- Subjective and Psychological Well-being (Diener, 2007)



Measuring Resilience/Cognitive Hardiness

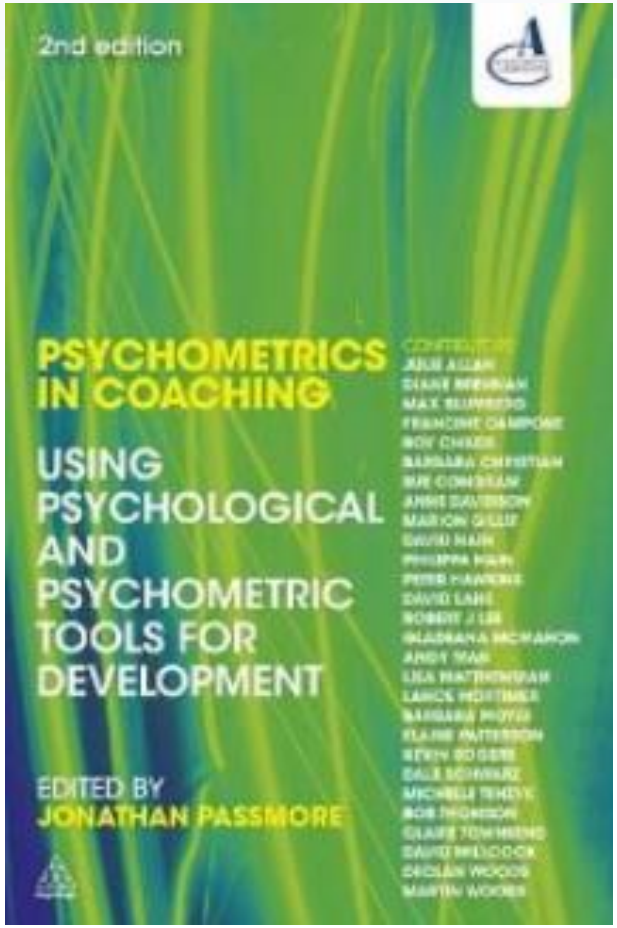
Stress Profile—WPS
Resiliency Inventory
http://talenttools.org





Coaching for Stress: StressScan (Nowack, 2013)

www.koganpage.com



Cognitive Hardiness Inventory (Nowack, 1994)

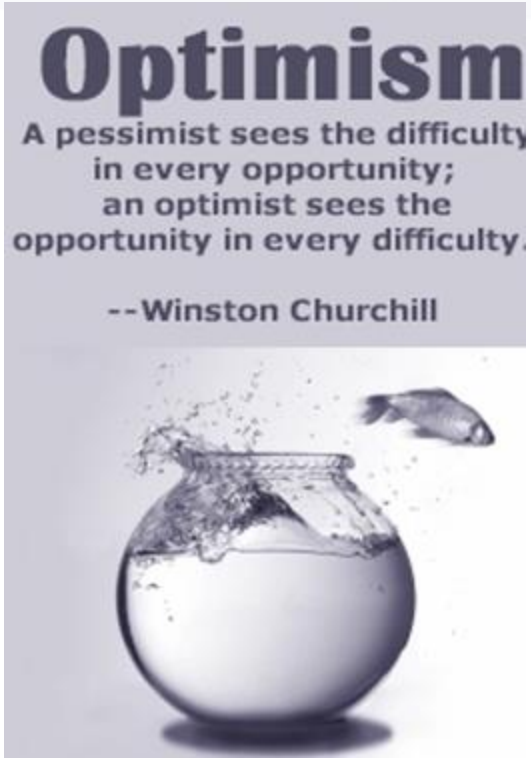
- 30 questions derived from the published Stress Profile (Western Psychological Services)
- High internal consistency reliability of 0.84
- Test re-test reliability of .94 (three-week period)
- Demonstrated associations with a variety of physical and psychological health outcomes including:
  - Absenteeism
  - Job Burnout
  - Depression
  - Hospitalization
  - Happiness/Subjective Well-Being
  - Job Performance
  - Cortisol Reactivity
  - Goal Accomplishment

Resilience Inventory
Stress Profile Scale (WPS; Nowack, 1996)

WHAT IS BEING MEASURED

- **Theoretical Construct: Personality Hardiness (Kobasa, 1979); Sense of Coherence (Antonovosky, 1979)**

- **A set of pervasive attitudes and beliefs that include:**
  - View change as a challenge, rather than a threat
  - Are committed, rather than alienated, with their activities a work and home
  - Possess a more internal, rather than external, locus of control
  - Possess an optimistic explanatory style by appraising bad events as relatively external, unstable and specific



WHAT HIGH SCORES MEAN

- **High scores suggest a general optimistic attitude and sense of resilience compared to those with low scores**

IMPLICATIONS

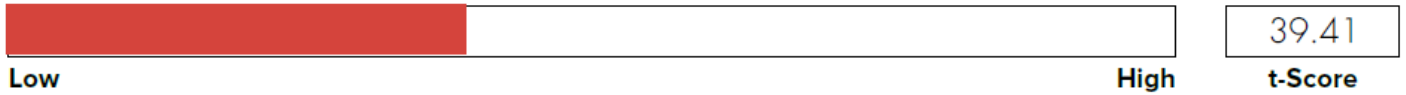
- **Hardy individuals who experience stress report significantly less illness, job burnout, and psychological distress**

“I feel my best when I’m happy.”

Winona Ryder

Resilience Inventory Interpretation

RESILIENCE



INTERPRETATION OF YOUR SCORE

Very High	t-score above 70 (about 98% of the people who took **Envisia Resilience Inventory** got a lower score on this scale)
High	t-score above 60 (about 84% of the people who took **Envisia Resilience Inventory** got a lower score on this scale)
Moderately High	t-score above 55 (about 69% of the people who took **Envisia Resilience Inventory** got a lower score on this scale)
Average	t-score equal to 50 (about 31% of the people who took **Envisia Resilience Inventory** got a higher score on this scale and about 31% got a lower score)
Moderately Low	t-score below 45 (about 69% of the people who took **Envisia Resilience Inventory** got a higher score on this scale)
Low	t-score below 40 (about 84% of the people who took **Envisia Resilience Inventory** got a higher score on this scale)
Very Low	t-score below 30 (about 98% of the people who took **Envisia Resilience Inventory** got a higher score on this scale)

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Developing Resilience

Resilience Factors	Coaching Interventions
Neurobiological: Effective regulation of the hypothalamus-pituitary axis (HPA) to stress; Capacity to regulate limbic reactivity to stress and prefrontal executive function	Stress inoculation training (SIT); Mindfulness based stress reduction meditation
Physical Health: High quality and adequate quantity of sleep; Regular physical activity; Healthy nutritional habits	Wellness/lifestyle management interventions
Social: Satisfaction and utilization of one's social support network; Strong social skills; Resilient role models	Enhancement of social and emotional competence (EI); Strengthening of social support networks

Behavioral Approaches to Enhance Resilience

1. Sleep More
2. Increase Physical Activity
3. Develop/Strengthen your social support network
4. Practice Gratitude
5. Fall Upwards

Behavioral Approaches to Enhance Resilience

6. Develop a “Catastrophe” vs. “Annoyance Mindset

7. Be Hopeful and Optimistic

8. Move Towards Goals…Or Quit

9. Practice Forgiveness

10. Identify/Deploy “Signature Strengths”

Resilience and Sleep: What We Know and Why It is Important

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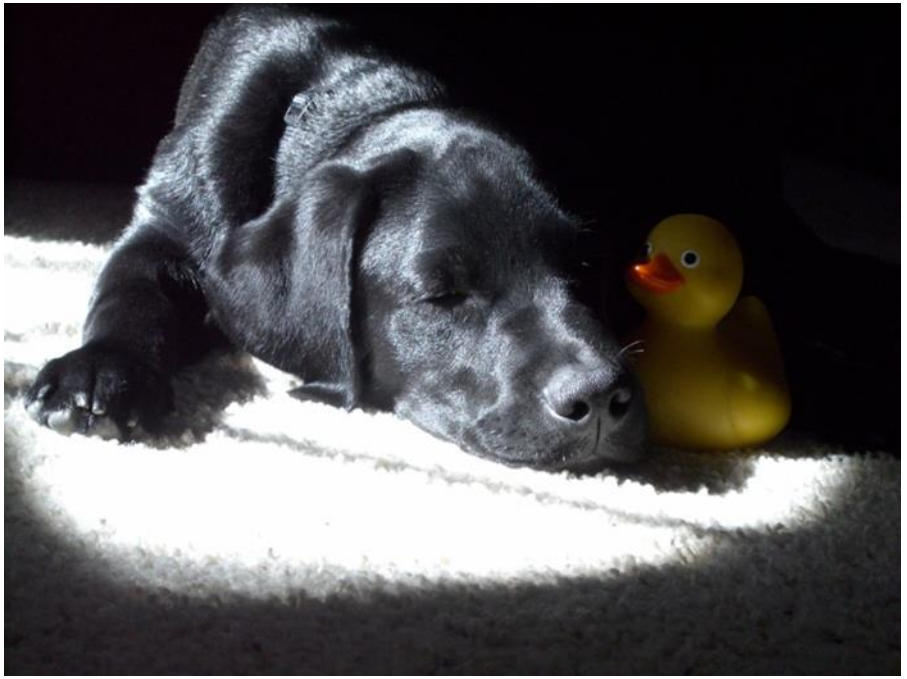
"The early bird gets the worm, but the second mouse gets the cheese."

Stephen Wright

Sleep Drive vs Body Clock

- Sleep is regulated by two neural systems: *sleep/wake homeostasis* and the *circadian biological clock*
- "Free running" experiments suggest our sleep clock is about *25 hours* but light and social zeitgebers reset it
- Circadian rhythm dips and rises with the *strongest sleep drive* between *2:00-4:00 am* and in the afternoon between *1:00-3:00 pm* (variation if you are a "lark" or "night owl")



The Architecture of Sleep

Awake
Beta waves

Drowsy, relaxed
Alpha waves

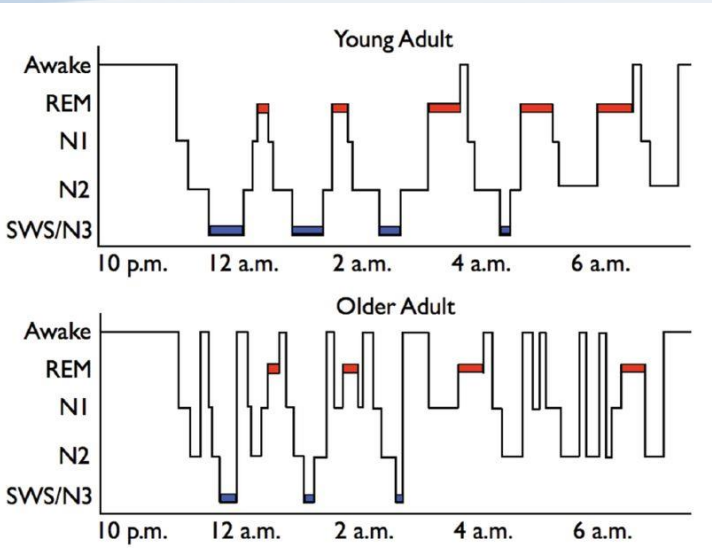
Stage N1 sleep
Theta waves

Stage N2 sleep
Sleep spindles

Stage N3 sleep
Delta waves

REM sleep
Fast, random

a



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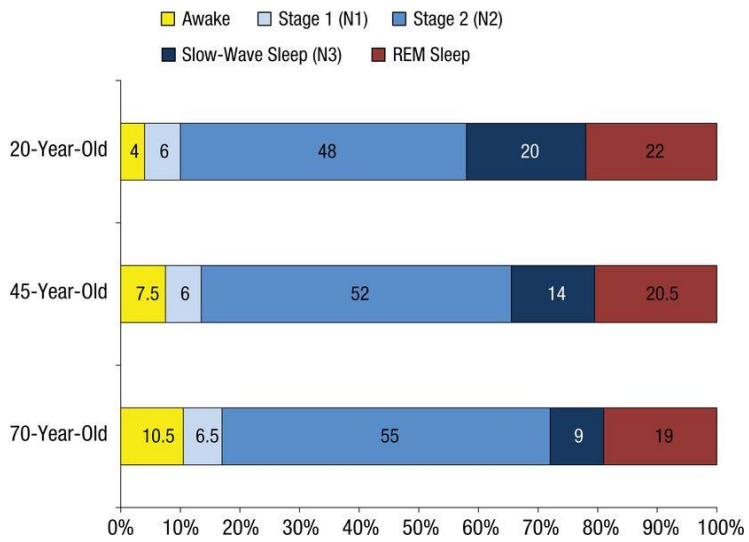

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“If sleep does not serve an absolutely vital function, then it is the biggest mistake the evolutionary process has ever made."

Allan Rechtschaffen

Why Do We Need Sleep?

Across an 85-year life span, an individual may sleep nearly *250,000 hours* or over *10,000 full days*

- Tissue restoration (Adam & Oswald, 1977)
- Brain-metabolite (β-amyloid) clearance (Xie et al., 2013)
- Activation of genes involved in creating of oligodendrocyte precursor cells or myelin (Bellesi et al., 2013)
- Stabilization and integration of memory (Scullin et al. 2015)

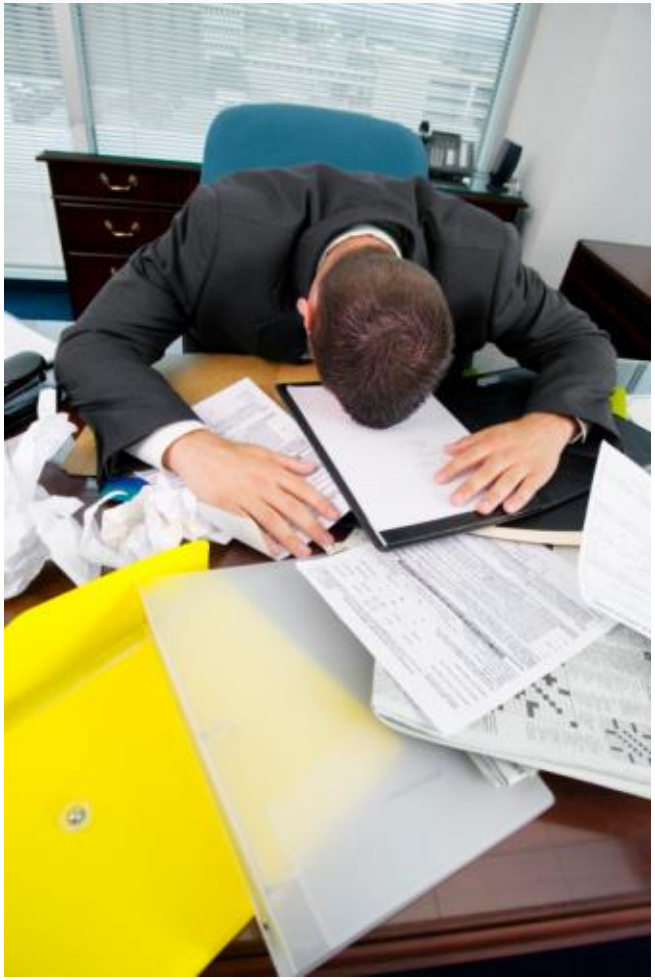
How Much Sleep Do We Really Need?

- In “free running” experiments, **95% sleep between seven and eight hours** out of every 24. Another 2.5 percent sleep *more* than eight hours. That means just 2.5 percent of us require less than 7 hours of sleep a night to feel fully rested (1 out of every 40)

- In Anders Ericcson’s famous study of violinists, the *top performers* slept an *average of 8 ½ hours* out of every 24, including a 20 to 30 minute midafternoon nap

Envisia Learning Sleep Results
5-Item Sleep/Rest Scale *Stress Profile* (WPS)

- Sample of over 25,000 working adults in diverse industries
- 35.7 percent reported “often” or “always” *receiving less sleep than required* because of staying up too late or getting up too early
- 23 percent reported being *tired during the day* due to poor quality sleep (either falling asleep took too long or unable to stay asleep)
- 8 percent reported *missing an entire night* or large proportion of sleep because of work or play activities in the last 30 days



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Effects of Poor Quality/Quantity of Sleep

Work Performance

- Diminished Information Processing Skills (Maddox et al., 2009)
- Poor Conflict Resolution (Gordon & Chen, 2014)
- Impaired Attention (Doran, Van Dongen & Dinges, 2001)
- Reduced Productivity (Hossain & Shapiro, 2002)
- Impaired Safety (Mellor & St. John, 2012)
- Increased Illness Related Absenteeism (Daley et al., 2009)

Health/Well-Being

- Impaired Immune Functioning (Lange, et al., 2003)
- Susceptibility to Infectious Illness (Cohen et al., 2009)
- Inflammation (Irwin et al., 2008; Mills et al., 2007)
- Coronary Artery Calcification (King et al., 2008)
- All-cause Mortality (Dew et al., 2003; Gallicchio et al., 2009)

Short and Long Sleepers

Depression

Bae, C. (2011). The good life: Good sleepers have better quality of life and less depression. *Sleep, 34*, A265.

Coronary heart disease (short or long)

Yong, et al., (2013). Sleep Duration and Chronic Diseases among US Adults Age 45 Years and Older: Evidence From the 2010 Behavioral Risk Factor Surveillance System (2013). *Sleep*, DOI: 10.5665/sleep.3028

Hoevenaar-Blom et al., (2011). Sleep duration and sleep quality in relation to 12-year cardiovascular disease incidence: the MORGEN Study. *Sleep 34*, 1487-1492.

Premature Death

15 year longitudinal study of over 70,000 men and women; Short sleepers (< 6 hrs) had significantly *higher* mortality than normal; Longer sleepers who reported little exercise were high risk for CHD but not cancer

Bellavia, et al., (2013). Sleep Duration and Survival Percentiles Across Categories of Physical Activity. *American Journal of Epidemiology, 179*, 484-491.

"I hate it when my foot falls asleep during the day because that means it's going to be up all night."

Steven Wright

The Power of Napping

- A 1995 NASA study found that a 26-minute nap improved performance 34% and alertness 54%
- A 60-minute nap improves alertness for 10 hours
- Naps of 90-120 minutes encompass all stages of sleep but may lead to sleep inertia

Rosekind et al., (1995). Alertness management: strategic naps in operational settings. *Journal of Sleep Research, 4*, 62-66.

Avoid Before Bed…..

Bright (Blue light) or “Netlag”

Chang et al., (2014). Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning alertness. *PNAS, 112*, 1232-1237. doi: 10.1073/pnas.1418490112

Higuchi et al., (2005). Effects of playing a computer game using a bright display on presleep physiological variables, sleep latency, slow wave sleep and REM sleep. Journal of Sleep Research. 14, 267–273.

Higuchi et al., (2003). Effects of VDT tasks with a bright display at night on melatonin, core temperature, heart rate, and sleepiness. *Journal of Applied Physiology, 94*, 5, 1773–1776.

Alcohol (REM Rebound)

Ebrahim et al., (2013). Alcohol and Sleep I: Effects on Normal Sleep Alcoholism: *Clinical & Experimental Research, 37*, 539-549.

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Nappuccino to Maximize Alertness

- Researchers at Loughborough University conducted a study in which some tired participants took a *15-minute coffee nap* and then were tested on a driving simulator. The coffee-nap group had fewer errors than those who only napped or only drank coffee

Reyner, L. & Horne, J. (1997). Suppression of sleepiness in drivers: combination of caffeine with a short nap. *Psychophysiology, 34*, 721-725.

- Another study examined how coffee nappers performed on memory tests. The participants who took *coffee naps* performed significantly better than those who only just took a nap or only had coffee

Hayashi, et al., (2003). The alerting effects of caffeine, bright light and face washing after a short daytime nap. *Clinical Neurophysiology, 12*, 2268-2278.

Sleep Deprivation Facts….

Sleep Facts #1
Sleep Deprived People Look Unattractive

- 23 participants were photographed after a normal night's sleep (eight hours) and after sleep deprivation (31 hours of wakefulness after a night of reduced sleep)
- Sleep deprived participants were rated as *significantly* less healthy, less attractive, and more tired compared with when they are well rested

Axelsson et al., (2010). Beauty sleep: experimental study on the perceived health and attractiveness of sleep deprived people. *British Medical Journal, 341, c6614*

Sleep Facts #2
Things Aren't Funny When You Are Sleep Deprived

- In 54 participants, humor appreciation for cartoon stimuli was enhanced by modafinil relative to both placebo and caffeine, but there was *no effect* of any stimulant medication on the appreciation of verbal humor during sleep loss

Kilgore, et al. (2006). The Effects of Caffeine, Dextroamphetamine, and Modafinil on Humor Appreciation During Sleep Deprivation. *Sleep, 29*, 841-847

"Never got to bed mad.
Stay up and fight."

Phyllis Diller

Sleep Facts #3
Sleepless Nights Mean Worse Fights

- In study 1, 87 participants reported more conflict on days *following poor night* of sleep controlling for conflict the previous day
- In study 2, 71 couples were rated on previous night of sleep and evaluated during a conflict interaction--Participants reported being *most successful* at resolving conflict when both partners were well rested

Gordon, A. & Chen, S. (2014). The Role of Sleep in Interpersonal Conflict: Do Sleepless Nights Mean Worse Fights? *Social Psychological and Personality Science, 5*, 168-175

Sleep Facts #4
Happy Affect Might Contribute to Poor Sleep

- Analyses from 100 participants selected from the National Survey of Midlife in the US (MIDUS II) found that high *trait positive affectivity* was associated with greater morning rest and better overall sleep quality
- In contrast greater *PA reactivity* (magnitude of change in daily PA in response to stress) was significantly associated with poor sleep

Ong, A. et al., (2014). Linking stable and dynamic features of positive affect to sleep. *Annals of Behavioral Medicine, 4*6, 52-61

Sleep Facts #5
You Are More Likely to Sleep Around...When You Are Sleep Deprived

- Adults engaged in less unethical behavior (e.g., less lying and cheating) on tasks performed in the morning than on the same tasks performed in the *afternoon*

  Kouchaki, M. & Smith, I. (2014). The Morning Morality Effect The Influence of Time of Day on Unethical Behavior. *Psychological Science, 25*, 95-102. doi: 10.1177/0956797613498099

- People are more inclined to cheat on a task at different times of the day depending on their individual body clocks, or "chronotypes"

  Gunia, et al., (2014). The Morality of Larks and Owls: Unethical Behavior Depends on Chronotype as Well as Time of Day. *Psychological Science, 25*, 2272-2274.

- *Lack of sleep* influences moral decision making and was moderated by *emotional intelligence* (i.e., those with higher EI were less susceptible to changes in moral judgments as a function of sleep loss)

  Killgore, et al., (2007). The Effects of 53 Hours of Sleep Deprivation on Moral Judgment. *Sleep, 30*, 345-352.

Sleep Facts #6
Light Sleepers are Heavier

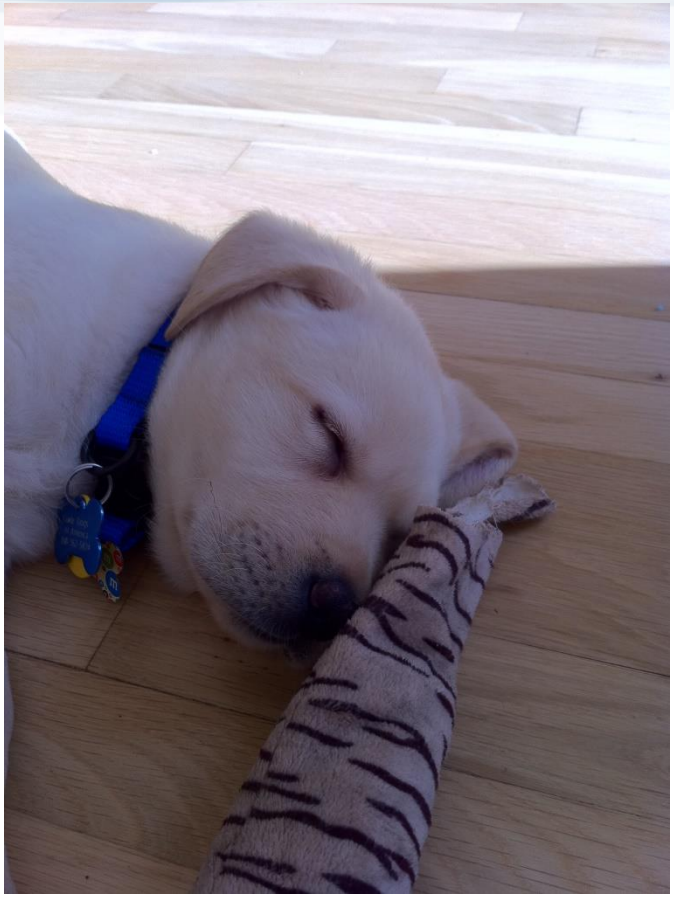
- Two hormones related to appetite, metabolism and calorie burning change during sleep (*leptin increases* and *ghrelin decreases*) and lack of sleep **lowers** leptin production
- In a study by Harvard researchers involving 68,000 middle-aged women followed for 16 years, those who *slept five hours or less* each night were found to weigh 5.4 pounds more — and were **15 percent more likely to become obese** — than the women who slept seven hours nightly (Patel, 2008)
- 11 healthy volunteers who spent two 14-day stays in a sleep laboratory limited to 5.5 hours of sleep a night and during the other they got 8.5 hours of sleep -- the subjects ate the same amount of food at meals but **consumed an average of 221 more calories** from snacks than they did when they were getting more sleep (Nedeltcheva, 2009)

Sleep Facts #7
Telepressure Causes Poor Sleep

- Workplace **telepressure** (urge to quickly respond to emails, texts & voicemails at all hours) appears to be *distinct* from other personal (job involvement, affective commitment) and work environment factors
- **Telepressure** predicts job burnout (physical and cognitive) and absenteeism
- A recent study found a *significant* association between **telepressure** and poor sleep quality (*r = .18*) and inconsistency (*r = .19*) but not quantity

Barber, L. K., & Santuzzi, A. M. (2014, November 3). Please Respond ASAP: Workplace Telepressure and Employee Recovery. Journal of Occupational Health Psychology. Advance online publication. http://dx.doi.org/10.1037/a0038278

Sleep Facts #8
zzzzzMail



- Study explored Smartphone use at home, use at work checking of text messages and overall use for 101 adults
- Poor sleep duration and quality were *significantly* correlated with:
  - Use of Smartphone for *personal* use (r = -.29)
  - Use of Smartphone for *work* related activities (r = -.43)
  - Checking Smartphone for *missed* text messages/calls (r = -.43)
  - *Overall* Smartphone use (r = -.42)

Balding, R. & Nowack, K. (2013). The Relationship between Smartphone use in the Workplace and Personal use on Perceived Stress. Poster Presented at the American Psychological Association Work, Stress and Health 2013 Conference, Los Angeles, CA

Sleep and Leadership
Emotional Intelligence Study (Nowack, 2015)

Regression Results

1. Poor quality/lack of sleep was a significant predictor of interpersonal competence by *peers and direct reports* after controlling for gender and stress

2. Poor quality/lack of sleep was not a significant predictor of interpersonal competence by the manager rating group after controlling for gender and stress

"I bought a self-learning record to learn Spanish. I turned it on and went to sleep; the record got stuck. The next day I could only stutter in Spanish."

Steven Wright

Enhancing Resilience

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Can Resilience Be Developed?

1. **12-week lifestyle and cognitive-behavioral intervention with MS patients significantly increase resilience**

   Giesser, B. et al. (2007). Living Well with Multiple Sclerosis: Lessons Learned from a 12-Week Community Based Quality of Life Program. Paper presented at 17th Annual Art & Science of Health Promotion Conference, March, 2007, San Francisco, CA

2. **Executive coaching over 10 weeks significantly increased resilience and well-being compared to a control group.**

   Grant, A. et al. (2009). Executive coaching enhances goal attainment, resilience, and workplace well-being: A radomised controlled study. The Journal of Positive Psychology, 4, 396-407

3. **29 coaches participating in a 12-week training program resulted in reduced anxiety, increased goal attainment and enhanced cognitive hardiness**

   Grant, A. (2008). Personal life coaching for coaches in training enhances goal attainment, insight and learning. Coaching: An International Journal of Theory, Research and Practice, 1, 54-70

4. **In a randomized controlled design, 56 female high school teachers participated in either a life coaching program for 10 sessions over two terms or a wait list control group and reported significantly higher cognitive hardiness and hope and decrease in depression**

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6. **For a period of twelve weeks, 11 participants listened to a self-administered hypnosis stress reduction program resulting in a significant decrease in the inflammatory marker IL-6 and negative appraisal coping**

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7. **In a cognitive behavioral coaching program consisting of four, 90-minute sessions with 31 executives showed significant increases in cognitive hardiness at the conclusion of the program while the organization was undergoing dramatic change**

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   DOI: 10.1080/14697017.2013.805159

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Article

A randomized trial of stress management for the prevention of new brain lesions in MS

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Abstract | Full Text (PDF)

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ABSTRACT

Objectives: This trial examined the efficacy of a stress management program in reducing neuroimaging markers multiple sclerosis (MS) disease activity.

Methods: A total of 121 patients with relapsing forms of MS were randomized to receive stress management therapy for MS (SMT-MS) or a wait-list control condition. SMT-MS provided 16 individual treatment sessions over 24 week followed by a 24-week post-treatment follow-up. The primary outcome was the cumulative number of new gadolinium enhancing (Gd+) brain lesions on MRI at weeks 8, 16, and 24. Secondary outcomes included new or enlarging MRI lesions, brain volume change, clinical exacerbation, and stress.

Results: SMT-MS resulted in a reduction in cumulative Gd+ lesions ($p = 0.04$) and greater numbers of participa remained free of Gd+ lesions during the treatment (76.8% vs 54.7%, $p = 0.02$), compared to participants receiving th control treatment. SMT-MS also resulted in significantly reduced numbers of cumulative new T2 lesions ($p = 0.00$ and a greater number of participants remaining free of new T2 lesions (69.5% vs 42.7%, $p = 0.006$). These effect were no longer detectable during the 24-week post-treatment follow-up period.

Conclusions: This trial indicates that SMT-MS may be useful in reducing the development of new MRI brain lesi while patients are in treatment.

Classification of evidence: This study provides Class I evidence that SMT-MS, a manualized stress manageme therapy program, reduced the number of Gd+ lesions in patients with MS during a 24-week treatment period. Thi benefit was not sustained beyond 24 weeks, and there were no clinical benefits.

Trial registration: ClinicalTrials.gov, number NCT00147446.

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Reconditioning the stress response with hypnosis CD reduces the inflammatory cytokine IL-6 and influences resilience: A pilot study

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Keywords:
Resilience
Hypnosis
Stress
Inflammation
Cytokines
Coping

ABSTRACT

Aim: The aim of this investigation was to measure the impact of a self-administered hypnosis inter vention on resilience and the inflammatory cytokine IL-6.
Method: Over a period of 12 weeks, 11 participants listened to a self-administered hypnosis stress reduction program designed to recondition and improve participants' emotional and physical reactions to perceived work and life stressors. Subjects were administered subjective measures of coping, resilience, and stress tolerance, as well as, IL-6, an objective blood measure of inflammatory activity.
Results: After 12 weeks, participants were observed to have a significantly lower IL-6 serum level from baseline. Further, participants reported a significant decrease in the use of negative appraisal copin (such as, self-deprecating statements, perfectionism, and catastrophic and pessimistic thinking), and a improvement in eating/nutritional habits following the intervention. Baseline eating/nutritional habits and threat minimization coping significantly predicted a change in serum IL-6 over the course of the intervention in stepwise hierarchical regression analyses.
Conclusion: Pilot study provides support that a brief self-administered CD hypnosis stress reduction program can modify a physiological measure of inflammation (IL-6), and improve coping and resilienc in the face of work and life stress.

1. Introduction

It is well established that psychological stress can lead to adverse physical and psychological health changes.[1,2] Chronic stress has been clearly associated with systemic inflammation and an overproduction of pro-inflammatory cytokines.[3–5] Chronic and high levels of inflammation and its cytokine precursors have been linked to long term morbidity and a variety of acute and chronic conditions including heart disease,[6] autoimmune disorders,[7] cancer,[8] and depression.[9] Similarly, inflammation and chronic cytokine production has been shown to be associated with mortality as well in recent studies.[10]

Further, it has become evident that pronounced emotional reactions such as anxiety and fear are directly linked to inflammatory changes in the body as well.[11,12] Additionally, emotions such as anger, hostility, and loneliness are associated with an escalation of inflammatory activity in the body.[13,14]

More recently, the inflammatory response has been implicated in influencing resilience. Resilience is the ability to effectively cope and bounce back after being confronted with challenges an adversity.[15] The inflammatory response has been found to elevate the risk of Post-Traumatic Stress Disorder (PTSD).[16] As a result, th inflammatory response has been hypothesized as a mediator o PTSD risk and resilience.[15]

Research conducted on the inflammation stress connection has focused on several key protein indicators with the inflammatory cytokines most frequently investigated including Interleukin 6 (IL-6) and Tumor Necrosis Factor alpha (TNF-a). A growing number of investigations have evaluated different stress modulating inte ventions and have observed subsequent decrements in inflamma tory cytokines including physical activity/exercise,[17] music,[18] relaxation training,[19] meditation,[20] and online programs.[21,22]

Several studies have evaluated the effect of hypnosis on modulating inflammatory cytokines. For example, Mawdsley, Jenkins, Macey, et al.[23] found that hypnosis treatments with ulcerative colitis participants led to a significant decrease in IL-6. Kiecolt-Glaser and her colleagues[24] examined immune disregulation in 37 medical students who were treated with hypnotic relaxation for acute examination stress. They found that frequent hypnotic laxation practice was associated with chan (CD3+ T

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Resilience Goal Setting Options

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Anonymous

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