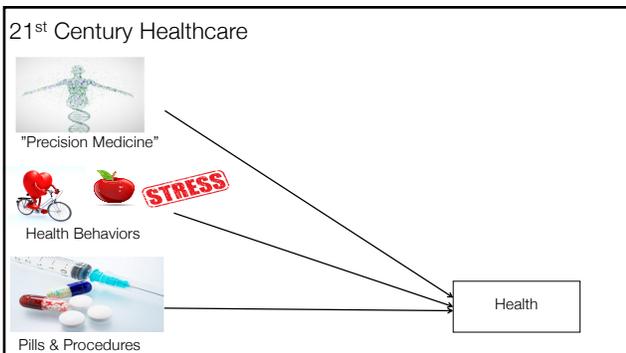
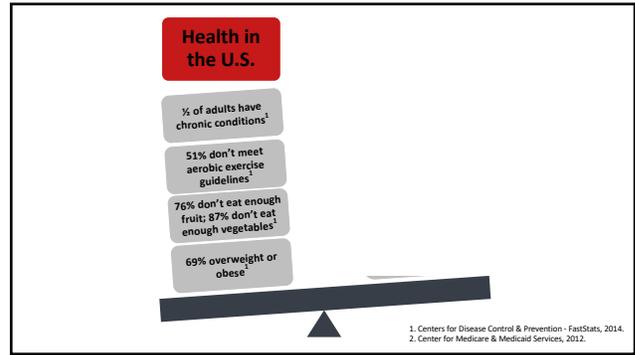


Nudging Mindset: Improving Health and Motivating Healthy Behaviors

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NIH SOBC Grand Rounds
April 23, 2018

Existing solutions are **inadequate**

in part, because they inadvertently generate **unhelpful mindsets**

MINDSET:

A lens or frame of mind which orients an individual to a particular set of associations and expectations

Influences affect, attention, motivation, and physiology

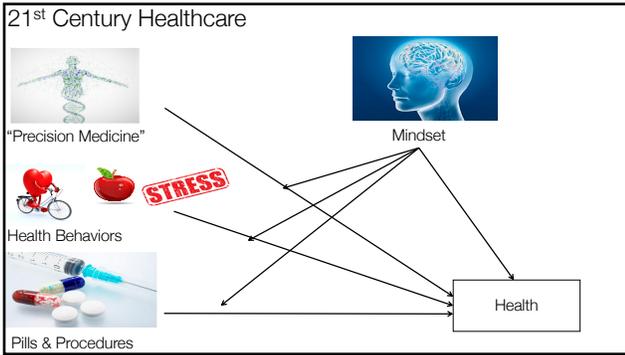


Influential Theory & Research

- Psychology: Beliefs, Expectancy Theory, Self-fulfilling Prophecies, Associative Networks, Implicit Theories
- Medicine: Placebo Effects
 - Effective in 60-90% of all diseases
 - Neurobiological mechanisms
 - Influences impact of real medications

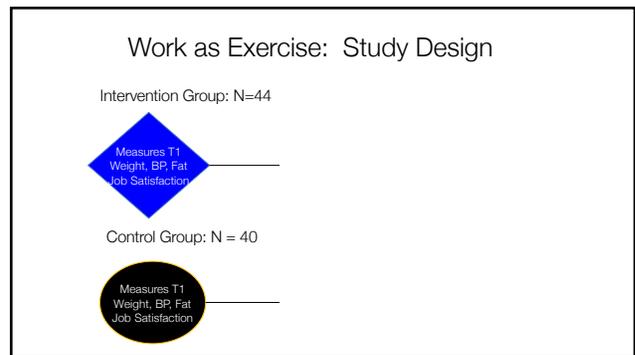
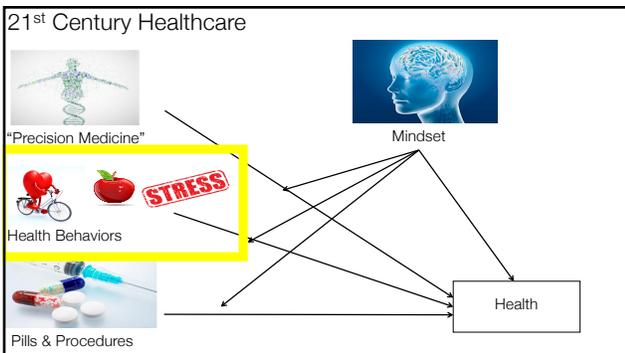


(e.g., Dweck, 2008; Taylor & Crocker, 1981; Langer, 1989; Eden, 1984;)
(e.g., Benson, H., 1996; Meissner, Kohls & Colloca, 2011; Price, Finnis, & Benedetti, 2008; Wager & Atlas, 2015)



3 Key Questions

1. **Where** do mindsets matter?
2. **How**, exactly, do mindsets influence health?
3. **What** can we do to deliberately harness mindset effects to improve health and wellbeing?



The Surgeon General strongly advises that all adults should accumulate at least 30 minutes of physical exercise per day.

Did you know... **YOUR WORK IS GOOD EXERCISE!**

It's true! Exercise doesn't have to be active recreation. It is simply a matter of being active and using good posture. All you have to do is move around enough every day to burn at least 300 calories.

According to the American College of Sports Medicine...

Changing lines for 15 minutes burns 40 calories!

Vacuuming for 15 minutes burns 50 calories!

Cleaning bathrooms for 15 minutes burns 60 calories!

This means that if you are actively vacuuming, changing lines, or cleaning for at least 2 hours a day, you are fulfilling the Surgeon General's recommendations for an active lifestyle. Now that is good work!

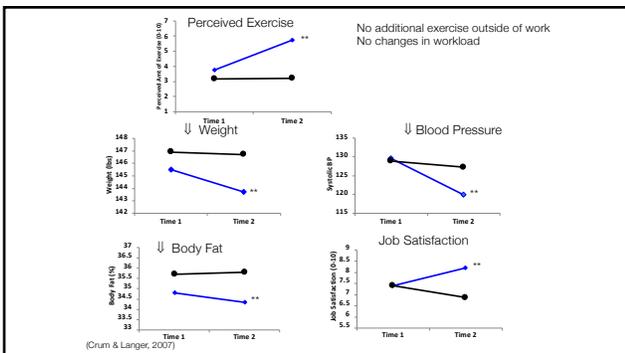
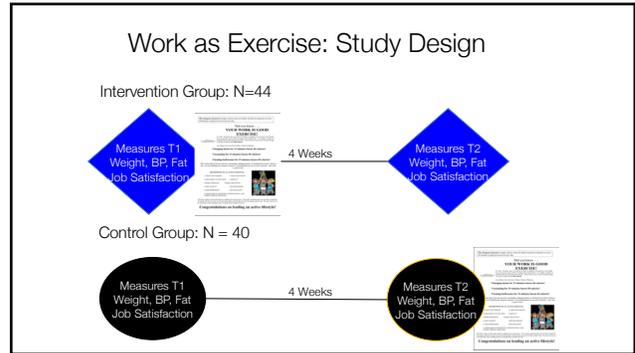
THE BENEFITS OF AN ACTIVE LIFESTYLE:

• HEALTHY WEIGHT	• A HEALTHY HEART
• LESS LIKELY TO GET SICK	• LESS FAT
• MORE STRENGTH	• MORE CREATIVITY
• LESS ANXIETY	• BETTER MOOD
• LESS DEPRESSION	• BETTER SLEEP
• LOWER RISK OF DIABETES, HYPERTENSION, AND OTHER CHRONIC DISEASES	

The time it takes to burn 300 calories is different for each person. The calories reported above are for the average 60 lb woman. We do not want you to stop doing other activities that are good for doing outside work. We just want you to be aware that a day cleaning means a good source of daily exercise.

Congratulations on leading an active lifestyle!

(Crum & Langer, 2007)



Work as Exercise: Implications

Mindsets matter in behavioral health. In this case, shaping the benefits of exercise.

What about in other health behaviors such as diet or exercise?

Is the effect really direct and independent of behavior change?

TASTE SHAKES EARN \$75!

Researchers at Yale Medical School are testing bottled shakes. The goal of this research is to get taste ratings while simultaneously measuring how people react to different nutrient contents.

Your participation will involve:

- One 30-minute online questionnaire
- Two 2.5-hour lab sessions where you will evaluate a label, taste a shake, and provide some measurements (including blood samples)

For your time and efforts, you will earn \$75

Eligibility criteria:

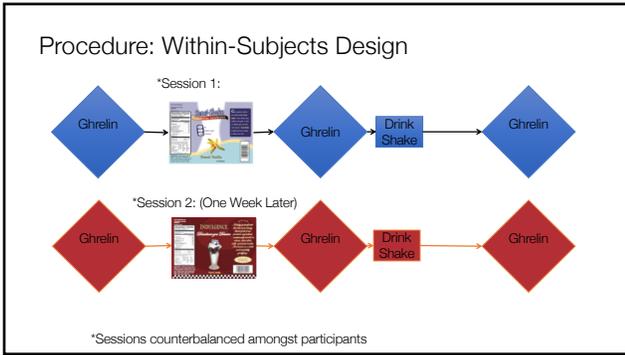
- Age range: 18-35
- None of the following: diabetes, pregnancy, food allergies to lactose or egg

To enroll in the study call 203-432-8233 or email taste.study@yale.edu
Website: <http://www.ycpi.yale.edu/clinicaltrials>

Yale Center for Clinical Investigation
333 Cedar Street, Suite 110, New Haven, CT 06510 www.ycpi.yale.edu

Ghrelin

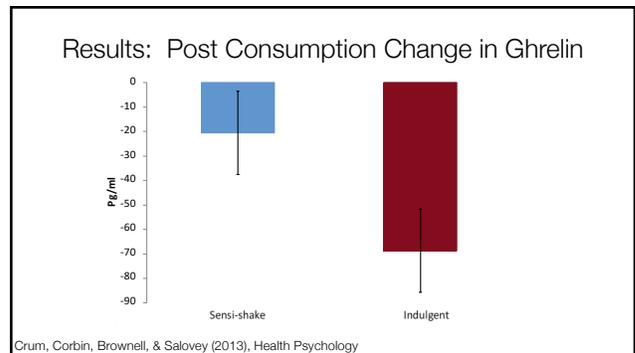
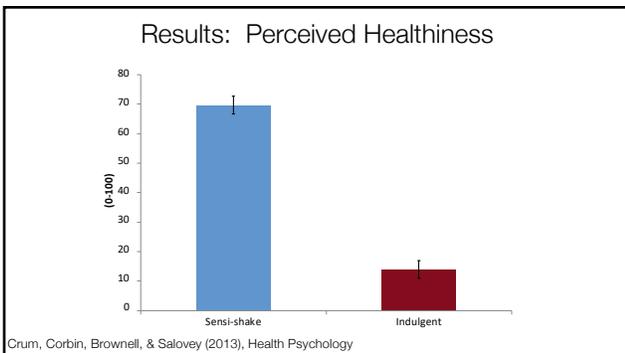
- Increases in ghrelin initiate hunger, slow metabolism
- Reductions in ghrelin follow food consumption, reduce hunger and speed up metabolism



Mindset Manipulation

	"Sensi-Shake"	Actual	"Indulgence"
Calories	140	380	620
Total Fat	0g	13g	30g
Saturated Fat	0g	8g	18g
Cholesterol	5g	75g	115g
Sodium	200mg	136mg	460mg
Total Carbohydrates	20g	47g	63g
Sugars	20g	44g	56g
Fiber	0g	1g	2g
Protein	15g	19g	31g

Crum, Corbin, Brownell, & Salovey (2013), Health Psychology

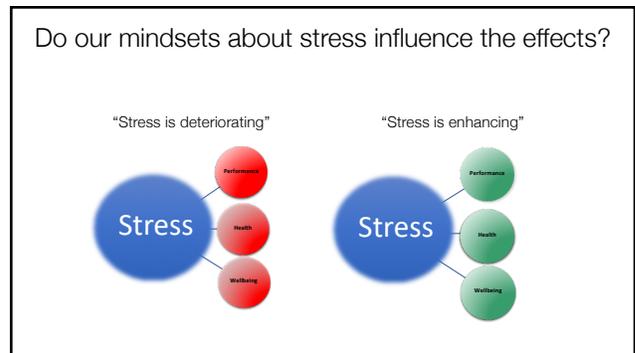
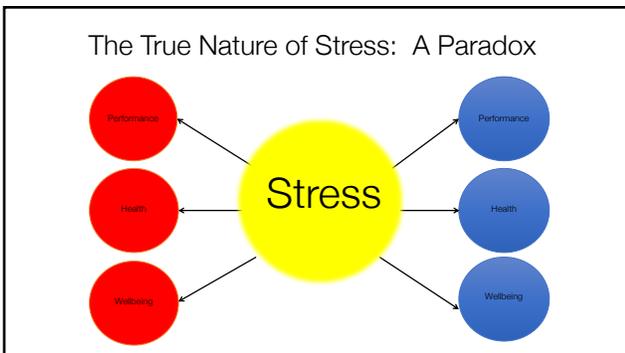
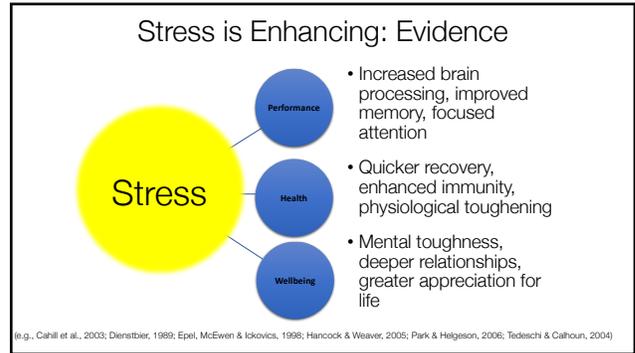
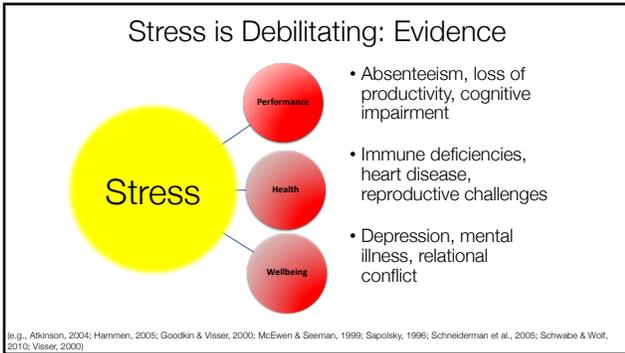


Mind Over Milkshakes: Implications

- Mindsets matter in food consumption
- Mindsets can have direct effects on physiology, holding the active ingredients constant
- Information and labels can literally get under our skin and affect physiology as well as perception
- Where else might information be evoking unhelpful mindsets?

Crum, Corbin, Brownell, & Salovey (2013), Health Psychology

- "A growing plague" (Blythe, 1973)
- "An epidemic" (Wallis et al., 1983)
- Stress is linked to the six leading causes of death (heart disease, accidents, cancer, liver disease, lung ailments, suicide) - American Institute of Stress
- Stress is considered America's number one health problem - World Health Organization
- Now more than ever we are worrying ourselves sick - What scientists have learned - The best news to come



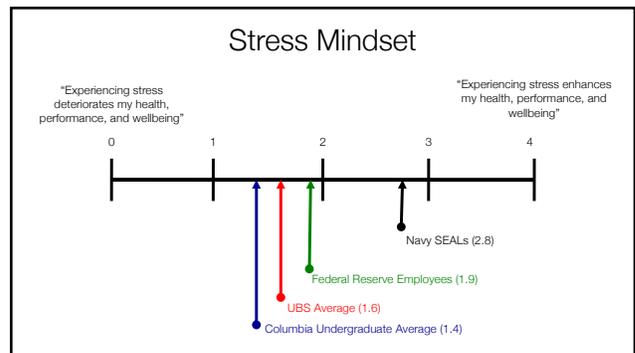
Stress Mindset Measure: 8 Items

Please rate the extent to which you agree or disagree with the following statements. For each question choose from the following alternatives:

0 = Strongly Disagree
 1 = Disagree
 2 = Neither Agree nor Disagree
 3 = Agree
 4 = Strongly Agree

1. The effects of stress are negative and should be avoided.
2. Experiencing stress facilitates my learning and growth.
3. Experiencing stress depletes my health and vitality.
4. Experiencing stress enhances my performance and productivity.
5. Experiencing stress inhibits my learning and growth.
6. Experiencing stress improves my health and vitality.
7. Experiencing stress deteriorates my performance and productivity.
8. The effects of stress are positive and should be utilized.

Crum, Salovey & Achor (2013) JPSP



“Stress is debilitating”



“Stress is enhancing”



“Stress is debilitating”



- Reduced performance
- Worse cognitive functioning
- Worse health
- Maladaptive changes in cortisol & DHEAs

“Stress is enhancing”

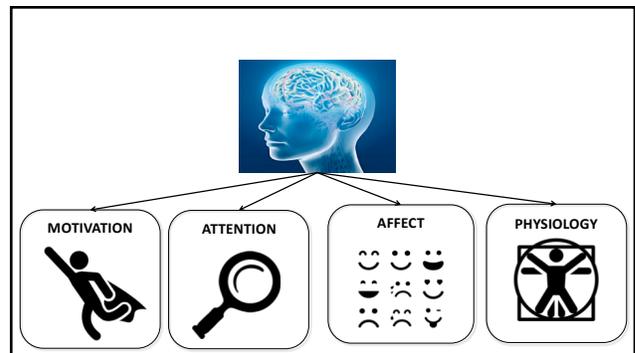


- Improved performance
- Better cognitive functioning
- Improved health
- Adaptive changes cortisol & DHEAs

Crum, Achor, & Salovey (2013), Journal of Personality and Social Psychology; Crum, Akinola, Martin, & Fath (2016), Anxiety Stress & Coping; Akinola, Fridman, Mor, Morris, & Crum (2017), PLOS ONE; Park, Yu, Metz, Tsukayama, Crum, & Duckworth (2017), Child Development

3 Key Questions

1. **Where** (else) do mindsets matter?
 - Health behavior: exercise, diet, stress
2. **How**, exactly, do mindsets influence reality?
3. **What** can we do to deliberately harness mindset effects to improve health and wellbeing?



“Stress is debilitating”



MOTIVATION

Avoid stress or counteract stress response

ATTENTION

Avoidant or vigilant

AFFECT

Predominately negative or blunted

PHYSIOLOGY

Hyper- Or hypo-aroused

“Stress is enhancing”



MOTIVATION

Utilize stress response to achieve goals

Greater desire for feedback¹

ATTENTION

On stress but also values and goals

Bias toward happy faces²

AFFECT

Complex mix of positive and negative

No reduction in negative affect²
Boosted positive affect²

PHYSIOLOGY

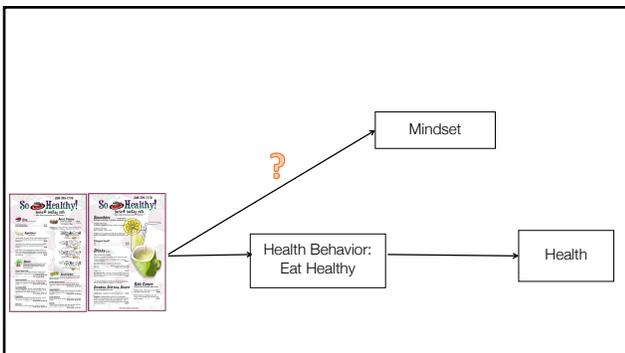
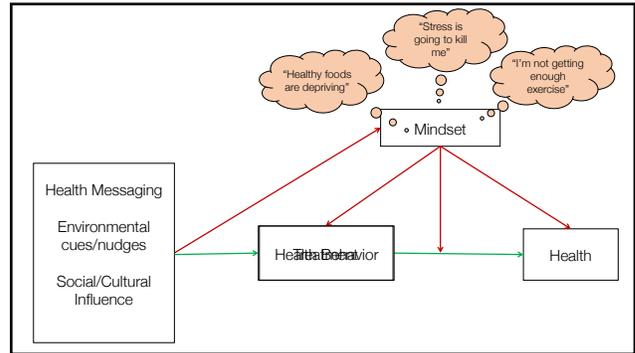
Optimal arousal

Moderate cortisol response¹
Boosted DHEAS response²

¹Crum, Salovey & Achor, 2013; ²Crum, Martin, Fath & Akinola, 2017

3 Key Questions

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Example linguistic themes

Theme	Exemplar Words
Tasty	delicious, tangy, flavorful
Indulgent	mouthwatering, filling, succulent
Exciting	action, adventure, spellbinding

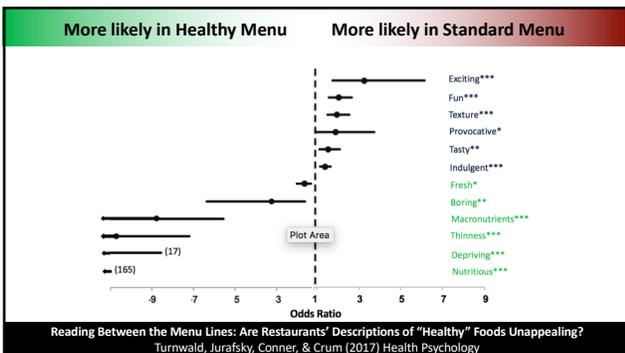
Top 100 Chain Restaurants in 2015 U.S. Sales

Casual Dining Family Dining (N = 37)

"Healthy Menu" (N = 26)

"Healthy Item Corpus" (N = 262 Healthy Items, N = 5,873 words)

"Standard Item Corpus" (N = 2,286 Standard Items, N = 38,343 words)



What if we changed the labels?



Brad Turnwald



Danielle Boles



- N = 607 diners per day
- 2 hour lunch (11:30 – 1:30)
- Sept – Dec 2016 (10 weeks)

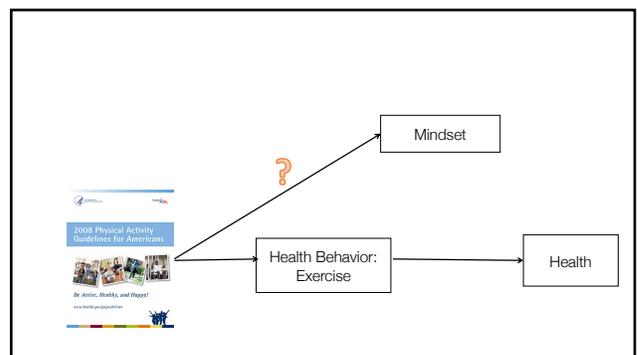
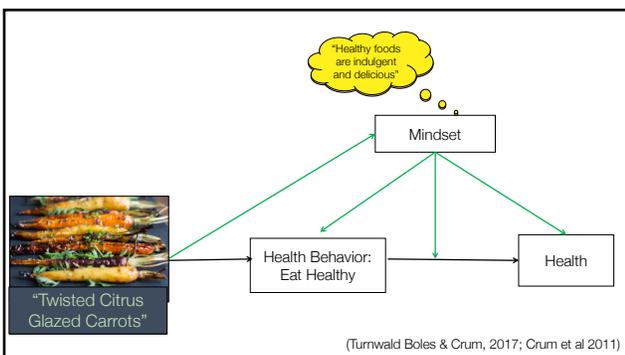
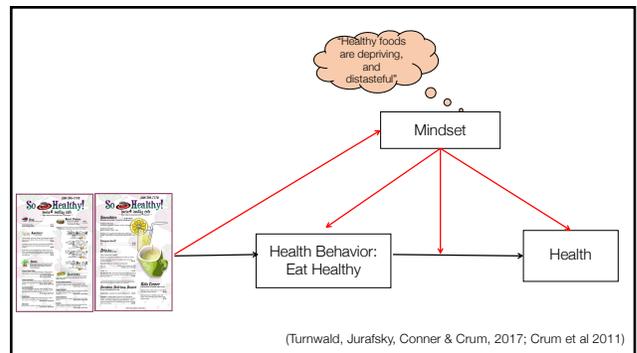
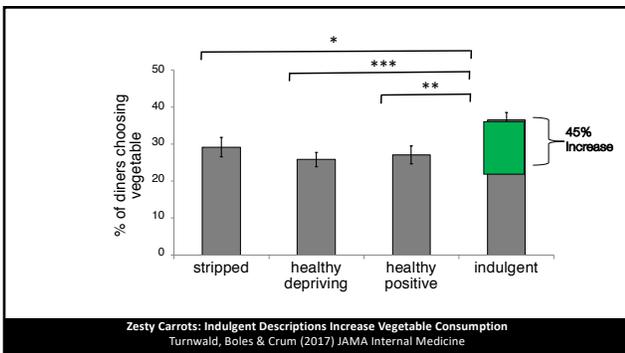


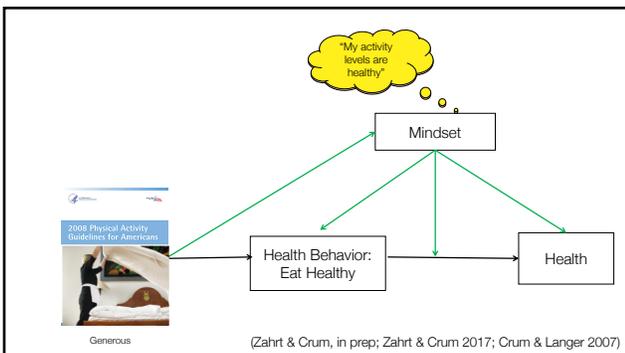
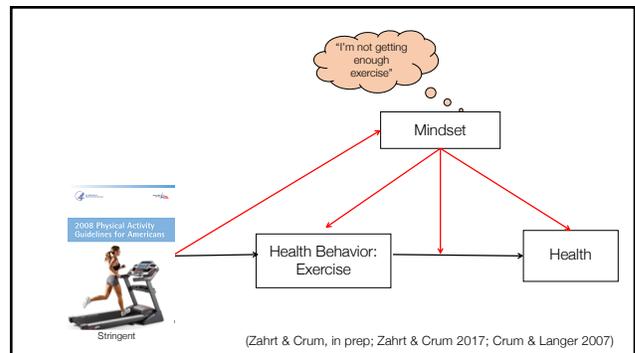
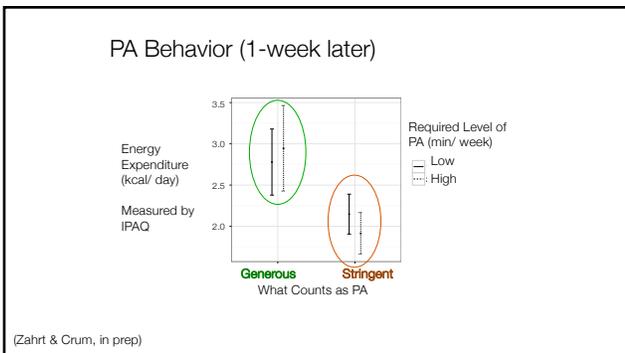
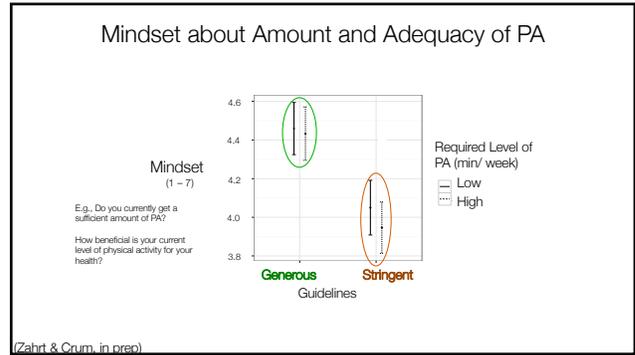
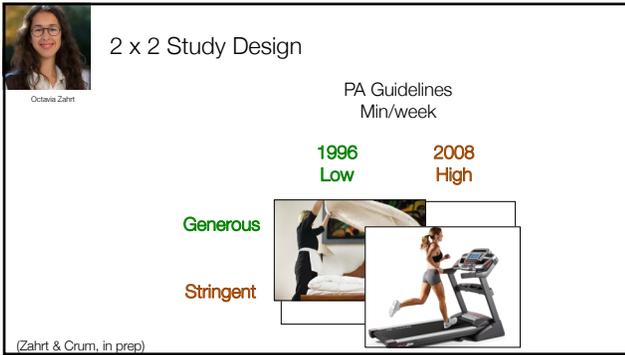
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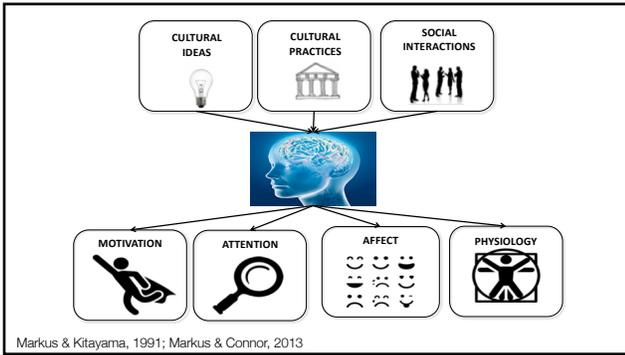
1. Stripped: "Carrots"
2. Healthy Restrictive: "Reduced cholesterol carrots"
3. Healthy Positive: "Vitamin-packed carrots"
4. Indulgent: "Twisted Citrus Glazed Carrots"

Zesty Carrots: Indulgent Descriptions Increase Vegetable Consumption
Turnwald, Boles & Crum (2017) JAMA Internal Medicine





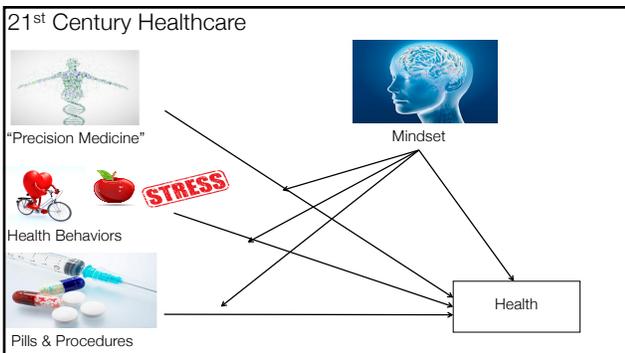
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 - What** can we do to deliberately harness mindset effects to improve health and wellbeing?
 - Alter cultural messages and products to elicit more helpful mindsets



Mindset: Admirable Qualities

- Can be "nudged" relatively easily and cheaply
 - Labeling
 - Information (e.g., short multimedia film clips)
 - Educational trainings
- Influence behavior and health by triggering a cascade of mechanisms
 - Motivation
 - Attention
 - Affect
 - Physiology
- Can have lasting (self-fulfilling and self-perpetuating) effects
 - More research is needed

(e.g., Crum & Langer 2007; Dweck, 2008; Crum et al 2011; Yeager & Walton, 2011; Crum et al., 2013; Turnwald Boles & Crum, 2017; Zahrt & Crum 2017)



Stanford
MIND & BODY LAB

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[Twitter: @allacrum](https://twitter.com/allacrum)
 Email: crum@stanford.edu

Thoughts? Ideas? Questions? Suggestions?

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The Art & Science of Human Connection

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